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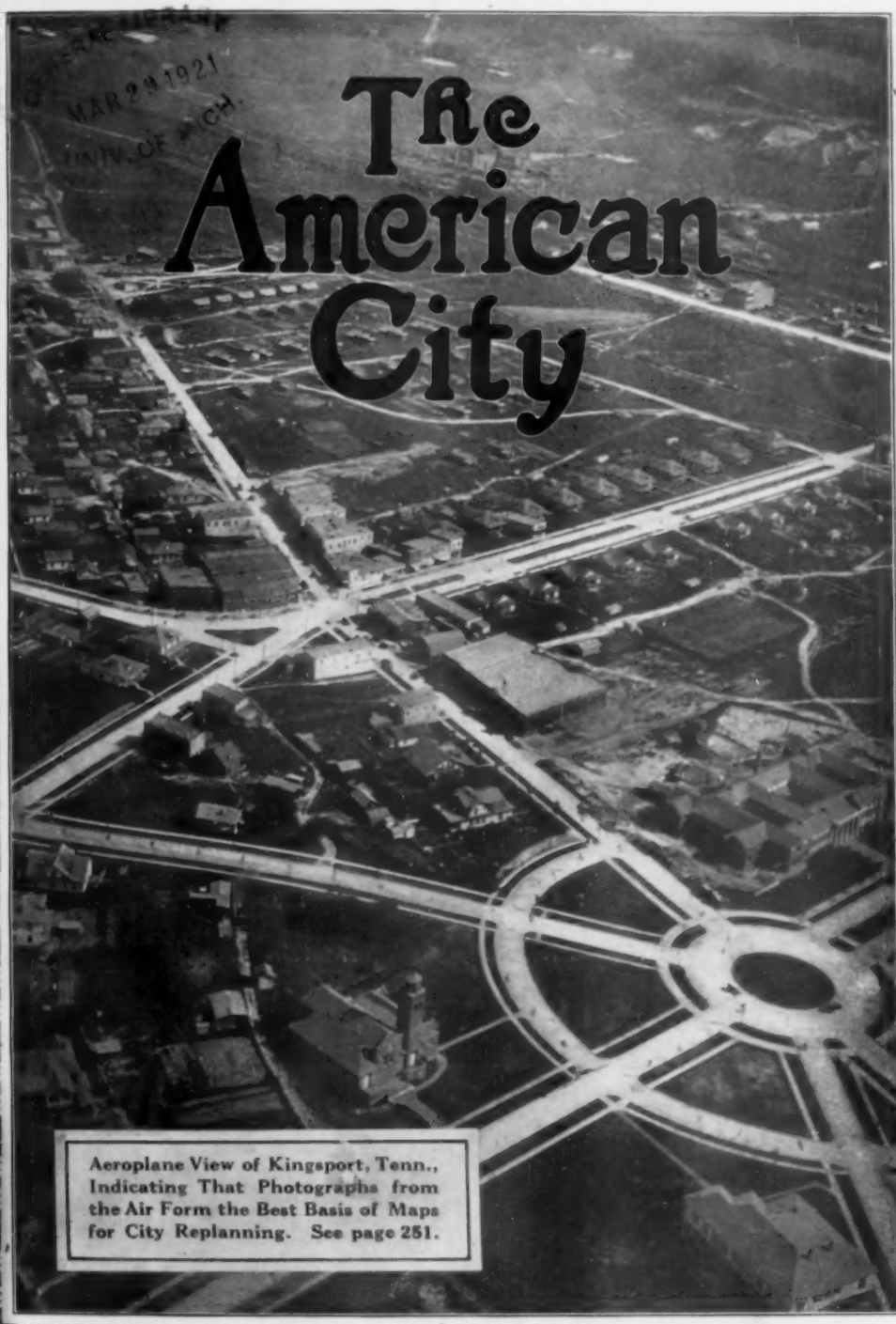
The American City



Aeroplane View of Kingsport, Tenn., Indicating That Photographs from the Air Form the Best Basis of Maps for City Replanning. See page 251.

The

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The American City

NEW YORK
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1921

The Policing of American Cities

By Raymond B. Fosdick

THE constant recurrence of crimes in all parts of the country, and more especially in the larger cities, has drawn attention sharply to problems of municipal policing. Whether or not there is a "crime wave," the outstanding fact cannot be avoided nor denied—life is cheap and property insecure, and both are far less safe in the United States than in other countries of similar advancement. Comparative tables of the prevalence of crime furnish ample evidence, not so much of a crime wave which might be expected eventually to abate, as of a condition continuing year after year, which up to the present shows few signs of betterment.

It is logical to contrast the figures for the United States with those of Great Britain, both because of the availability of statistics, and because there are ordinarily no wide discrepancies between the figures for England and those for the countries of continental Europe. Consideration of four major crimes—burglary, robbery, auto-stealing, and homicide—furnish rather startling comparisons.

BURGLARY

(Cases including housebreaking by day or night, shop-breaking, sacrilege, etc.)

	1916	1917	1918
England and Wales	7,809	9,453	10,331
Scotland	3,977	5,073	*
London	1,581	2,164	2,777
Liverpool	1,135	1,361	1,136
New York City	*	9,450	7,412
Chicago	2,113	5,623	3,643
Detroit	2,736	3,080	2,047
Cleveland	*	2,752	2,608
St. Louis	3,212	2,483	2,989

* Not available.

The story is repeated in the burglary insurance rates. Although it is impossible to make exact comparisons, owing to differences of insurance methods and practices, the general conclusion is warranted that burglary rates in American municipalities are from fifteen to twenty times higher than in the principal cities of England.

Robbery, especially highway robbery, appears as an almost distinctively American crime. For instance, in 1918 New York had 849 robberies, as against 63 in London and 100 for all England and Wales. In each of the four years from 1915 to 1918 New York City had from four to five times more robberies than occurred in all England and Wales in any of the five years preceding the war.

Nor is this condition in the United States peculiar to New York. Cities like St. Louis and Detroit, in their statistics of robbery and assault with intent to rob, frequently show annual totals varying from three to five times greater than the number of such crimes reported for the whole of Great Britain.

Thefts of automobiles make a still more discreditable showing. In 1919, 5,527 cars were stolen in New York, while only 290 cases were reported in London. It is impossible to make accurate deductions from these figures, as there are certainly more motor cars in New York than in London. But these figures confirm the others.

Statistics for homicide, including murder and manslaughter, prove how much more cheaply human life is held in this country.

	1914	1915	1916	1917	1918
England and Wales...	220	226	196	180	154
Scotland	39	57	53	29	*
London	46	45	31	39	37
Liverpool	8	8	8	9	5
Glasgow	11	11	18	11	9
New York	244	234	186	236	221
Detroit	*	*	62	94	42
Chicago	216	198	255	253	222
Washington, D. C.....	26	25	24	24	27

* Not available.

Before the war the average number of murders per year in Berlin was 25, and in Vienna 19.

No further proof is needed to convince even the most optimistic that American police systems are not successful in combating crime; and, further, that in comparison with European systems they are less effective than those of other countries. The natural reaction in the mind of one reading these discreditable figures is wholesale condemnation of the police. But before indulging in any such sweeping generalization, it is necessary to consider several factors that make the work of the American patrolman and detective much more difficult than that of his European counterpart.

Difficulties of American Police Departments

One of these factors, the importance of which is not easily measured, is the heterogeneity of the population. Not only is there a large foreign element in most of our cities, but there is the enormous negro population in certain sections. The figures indicate clearly that colored persons and those of foreign origin are rather more given to felony than the native white element. For example, the figures for Chicago in 1918 show that the native whites were 62.1 per cent of the population, and furnished 55.1 per cent of the felony arrests. The negroes, with 2 per cent of the population, had 13.2 per cent of the arrests for felony. Figures from other cities show similar conclusions; but they demonstrate that, although the native white population is somewhat less given to crime than either the foreign white or native negro element, the difference is by no means so great as is often assumed. There is in the disposition of Americans a curious mixture of violence and tenderness, which makes them quick to commit crimes of violence, while, at the same time, it causes the public to regard the criminal with a certain tolerance, which may run from an easy-going slackness about following up a prosecution to maudlin sympathy for a thoroughgoing scoundrel. This latter trait accounts for the extraordinary miscarriages of justice in the case of persons undoubtedly guilty of grave offenses.

In addition to the heterogeneity of the population, which undoubtedly increases the difficulties of apprehending a criminal, it is probable that the nomadic character of great numbers of the inhabitants of this country both increases the quantity of crime and complicates the problem of its detection. Our large floating population, drifting from city to city, without strong attachment to any spot, is free from many of the restraints which affect citizens with fixed abodes; and the fact that its members know themselves to be "strangers" in a community gives them a sense of security impossible for a man with a large and varied circle of acquaintances. This, of course, greatly adds to the difficulties of the detective in his search for clues. In older countries, where the population is stabilized, the problem is far simpler. Also, in many countries, especially those of continental Europe, every citizen is required to possess certain identifying papers, such as his birth certificate, record of military service, etc., which considerably facilitates the work of the police in keeping track of suspicious characters.

While admitting that the problems which confront American police systems are exceedingly difficult and complicated, it must also be recognized that the systems themselves are far from perfect. The fundamental weaknesses are the want of continuity in police policy, and "politics."

Weaknesses of American Police Systems

From its beginnings the machinery of police control has been subjected to a shifting series of experiments, in a restless search for ideal systems. With this idea, cities have tried partisan boards, bi-partisan boards and non-partisan boards; they have lodged the appointment of their heads of police in the hands of governors, legislatures, mayors, common councils, boards of public safety, attorney generals, judges of the circuit court, probate judges, state auditors, state commissioners of public buildings, and the people themselves; they have laboriously written into their laws elaborately devised checks and balances, covering every possible contingency of administration, and every item of probable expense; they have borrowed the plans of other cities which

happened at the time to have honest police executives, or have combined the plans of a number of communities in fanciful arrangements of their own, in which, likely as not, an elaborately chosen board of commissioners with full responsibility and no powers was superimposed on a chief of police with wide powers and no responsibility.

In the 75 years in which New York City may legitimately be said to have had a regular police force, nine fundamental changes, involving distinct breaks with the past, have occurred in the framework of her organization. In 91 years, London has made but one real change in the system of control, and the control of the Paris police remains practically unchanged since the days of Napoleon. Obviously, any system, and especially a police system, derives a great part of its virtue from continuity of policy over considerable periods; frequent and kaleidoscopic changes tend inevitably to disorganization and ineffectiveness.

Of the unfortunate influences of "politics" on police organization, little need be said; not because the effects are negligible, but because they are too familiar in every city to require elaboration. It may be deplorable, but it can scarcely be called strange, that the chief or commissioner who realizes that his tenure of office depends not upon his professional ability but upon political fortune, should spend a proportionate amount of his time and energy "where it will do the most good." This political conception—that police positions are plums for the local faithful—has also restricted cities in their choice of officials. In America it would be surprising for a municipality to select its chief of police from another community, regardless of his qualifications. In other countries quite a contrary theory obtains. For example, the police commissioner of London was chosen to that position after twenty successful years in the Liverpool department; the police commissioner of Rome previously headed the departments of Ancona and Naples. The relative merits of this system of selection by demonstrated ability without regard to residence are in marked contrast to the generally accepted American ideas.

With such chaotic policies obtaining in the choice of the higher officers it is evident that the condition of the rank and file must leave much to be desired. Grave abuses have undoubtedly been corrected in many cities by the adoption of civil service regulations of appointment and promotion; but the value of a written examination as a test for promotion is pretty generally discredited, and often enough the examination for appointment is little more than a perfunctory formality. Only too frequently the net result of putting the force on a civil service basis has been simply to make it nearly impossible for a conscientious chief or commissioner to get rid of an undesirable and even rascally patrolman.

The prevalence of crime throughout the country, both in the present and in the past, has demonstrated the fact that our police systems are ineffective, even though we recognize the extraordinary difficulties of the problems of crime prevention they are called upon to face. The American citizen is paying heavily for political corruption, the ineptitude of officials, the lack of continuity and plan in police policy. But the recollection of conditions of the not long distant past leaves little doubt that the turn has come; bad as conditions are now, they are vastly better than those accepted as commonplace and inevitable a generation ago and even more recently. The awakening of civic consciousness in all municipal affairs has come rather slowly, but it has come. In time the American public will have a clearer comprehension of the exacting demands of the police profession, and will insist on systems of police control which will satisfy those demands.

EDITORIAL NOTE.—This article is based upon the author's book, "American Police Problems."

"When people begin to feel the ties which bind them together as citizens, and which attach them to the place which they inhabit, when they understand that their prosperity, their dignity, their happiness are bound up with the welfare of the city; when they learn to cherish their home town, their love for which unites with and intensifies their love for the nation, this expansion of civic consciousness is not the least of the benefactions gained from the adoption of comprehensive programs for future civic development."

The Sanitary Survey a Check on Community Health

By William L. Munson, M. D.
Sanitary Supervisor, New York State Department of Health

WHAT would you think of a business house that never took an inventory or that had no accurate idea whether or not a profit was being made? An answer to this question is not necessary, because "such an animal does not exist." Concerns doing a business that involves the use of other people's money have to know—their employers demand that they know. Old methods in commerce, no matter how good they may be, must give way for better methods. Still, the same expert business men will live their lives in a community and never know whether that community is the best place to bring up their children in, or whether the water is fit to drink. Then when an epidemic of typhoid or some other preventable disease occurs, Mr. Good Business Man will want to know why—and heaven and earth will then be moved in order to check it, when just a small part of the expense and energy, if used before, would have prevented the occurrence. Why, then, you ask, do these things occur when we know how to prevent them?

Community health is now almost reduced to an exact science. The "art of medicine" is rapidly disappearing and in its place is coming exact and scientific medicine. Today you can buy your protection against disease as you do your coal or your flour. This is literally true with many diseases. If you are afraid of diphtheria because it is prevalent in your community, you can have your blood tested and know whether you will contract the disease if exposed. Then if you are found to be susceptible, you can be treated so that you will not have diphtheria. Surely this is buying health.

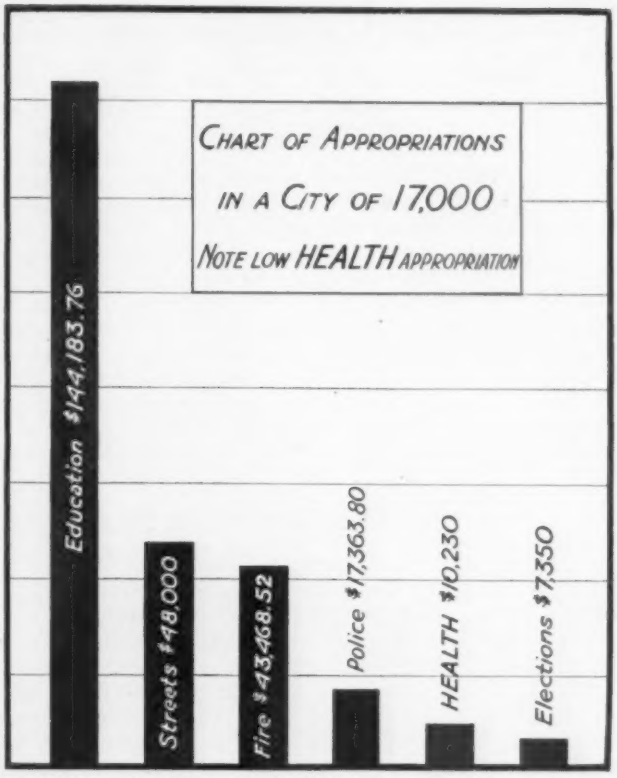
The control of many other diseases beside diphtheria is well understood by doctors. Why, then, with all this fund of knowledge at our disposal, are we constantly seeing persons die of diseases that are so easy of control? Simply that we keep the fund of knowledge at our disposal and not in use.

Many people will say, "We have a health department and it is supposed to attend to these things." Yes, you have a health department, and, in many cases, without appropriations sufficiently large to run a good one-horse peanut-stand. It seems to be very slow work, but gradually people are coming to understand that good health departments and good health officers cost money, just as good roads and good highway departments do. If you want to know where you stand in the protection from disease that your city is giving its citizens, take an inventory of your health department, making a sanitary survey of your city's activities along this line. Put down in black and white on one side of the ledger what you are doing, and on the other side charge up the things that should be done but are not.

The sanitary survey, when completed, should cover all the activities in the city for the promotion of good health. It should also show where the deficiencies are and what should be done to remedy the complaint of shortcomings. Such a survey should contain:

1. Introduction
   - (a) History of work to date
   - (b) Industries
   - (c) Character of citizens
   - (d) Assessed valuation
   - (e) Taxation for all purposes
   - (f) Comparison with taxation for health
2. Statistics
   - (a) Birth rate
   - (b) Death rate
   - (c) Infant mortality rate
   - (d) Longevity rate
   - (e) Morbidity rate
   - (f) Death rate from preventable diseases
3. Record keeping
   Covering register for tuberculosis, record cards of communicable diseases, card index for nuisances, card indexes for inspection of milk, meat, foods and buildings, and files for reports, copies of letters, etc., all of modern and accepted character
4. Financial statement
   The budgets for two or three years should be given for comparison, showing where and how increase of work has taken place; also, statement of salaries of those employed in the health department should be made

5. Communicable diseases
   A list of those reported each year for five years should be given for comparison purposes. The methods of handling these diseases should be known, whether contacts, carriers and missed cases are being investigated, and the methods of disinfection used, also whether epidemiological studies were being made
6. Laboratory work
   Number and kinds of examinations made, and whether modern and up-to-date, and if tests for detection of disease are being carried out
7. Nursing service
   (a) Number, whether sufficient
   (b) Kind and character of nursing done
   (c) Routine work
   (d) Constructive work
   (e) Number of visits made, total work done, and results of constructive work
8. Food inspection
   Kinds of inspection made, whether special investigators are used, etc.
9. Sanitation
   (a) Water: methods of purification; character and dependability of water; bacteriological counts
   (b) Milk: amount of different grades; number of inspections of dairies; number and reports of bacteriological counts on same
   (c) Sewage disposal: methods used, etc.
10. Clinics
   (a) Child hygiene
   (b) Pre-natal
   (c) Tuberculosis
   (d) Mental hygiene
   (e) Venereal disease
   (f) Pre-school
11. Public health education
   This phase of the work is of great importance and should be stressed. The amount of coöperation of local officials, local newspapers, and local churches should be inquired into
12. Hospitals
   Number, kinds, and whether isolation for infectious diseases is provided



INCREASED HEALTH APPROPRIATION WILL HELP PROPER HEALTH ADMINISTRATION

13. Recreation
   Playgrounds, parks and gymnasiums
14. Industrial hygiene
   (a) Occupational diseases
   (b) General sanitation
   (c) Housing
15. School children
   (a) Amount of defects
   (b) Amount of correction
   (c) Sanitation of buildings
   (d) Disease census
   (e) Education and hygiene
16. Recommendations
   Stating the things necessary in order to furnish satisfactory results. These are the items that should be known and well investigated before recommendations are made

A well-rounded health department laying stress upon no particular thing but functioning as a whole, is much to be desired over the health department that may run to one particular phase of public heatlh work, forgetting all others.

When this mass of data is prepared it should not be filed away but should be put

to work. Statistics are good for those who use them; they are good for nothing to those who do not.

What should an analysis of the data in a sanitary survey give in terms that are not technical and can be understood by the taxpayers?

First, the cost of health protection to each person in the city, not to be expressed in so many mills per dollar of assessed valuation but the amount in dollars and cents to each thousand dollars of assessed valuation; thus, "the tax rate for health service is 89 cents per $1,000 of assessed valuation, or, a taxpayer having a home assessed $4,000 would pay $3.56 per year to protect that home from disease." This, it is apparent, can readily be understood. Also, the cost per person should be given.

Second, a proper survey will show "old stock on hand." If antiquated methods are used they will be unearthed and should be discarded. Duplication of work, and unnecessary work, will be shown.

Third, the offenses of omission are brought to the surface in making such a complete inventory, and these corrections should be in the recommendations.

Fourth, graphic chart showing amounts of different appropriations for various city activities, communicable diseases, movement of infant mortality, birth and death rate.

It is not advisable to clutter up an otherwise good survey with material that requires an expert to interpret it. Nothing, however, is as convincing to the lay mind as a picture of the relative difference in appropriations for various activities.

The Reward of City Planning

By L. S. Cole

City planning may be divided into two major phases, namely, city building or rebuilding, and city extension. In this latter phase the realtor looms large, and on him rests a large part of the responsibility for the success or failure of the work. He should give careful attention to the future needs of the city in general and of the district in particular, considering the welfare of his city before his personal gain, making himself a power for good in his community. In this way only will he merit the distinction which the title of "realtor" confers upon him.

Many cities are blessed by nature with hills, valleys, streams, etc. These are things of beauty as well as utility. How often we find a city which considers them liabilities! Here is a town bisected by a creek too small for navigation. It is made into a dumping-ground and general health menace, the cause of endless litigation and expense, an eyesore, which if properly handled would prove a source of pride and pleasure, a priceless asset.

These are the things city planning aims to correct through careful zoning of industrial activity and control of building expansion, together with utilization of natural and created resources. Thus shall we be able to attract and retain industry, foster commercial activity, inculcate and build up in increasing measure the spirit of community service, to our personal gain and national prosperity. Increased benefits, reduced taxes, these shall be our reward; for, after all, taxes are merely the selling price of community service, and the burden or privilege of paying taxes will be determined entirely by the measure and quality of the service rendered.

ACKNOWLEDGMENT:—From an address delivered before the Indiana Real Estate Association.

An Annual Transportation Prize to Be Awarded

The American Society of Civil Engineers at its annual meeting in January accepted the offer of the *Engineering News-Record*, to establish an "Arthur M. Wellington Prize" to be awarded annually for the best paper presented before the society on any phase of the science and art of transportation, whether by land, water or air. The prize is a memorial in honor of the former editor of the *Engineering News* and author of the well-known book entitled "The Economic Theory of Railway Location." A fund of $2,000 has been provided, the annual income from which will constitute the material element of the prize, and should stimulate thought on this subject.

Linking New York and New Jersey

The Isolation of these Two States from Each Other to be Overcome by New Vehicle Tunnels

By Clifford M. Holland

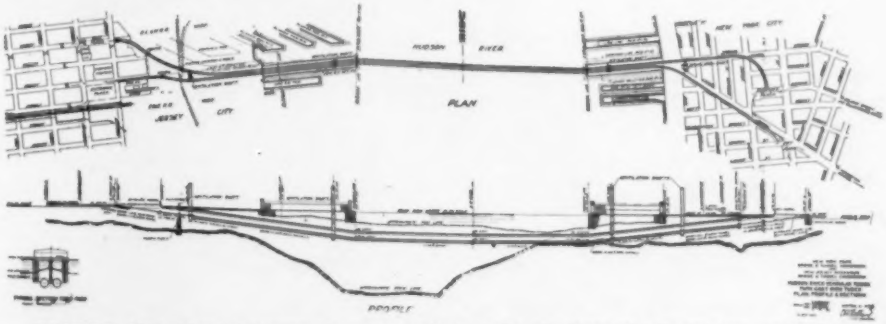
Chief Engineer, New York and New Jersey Tunnel Commission

THE states of New York and New Jersey, which are vitally interdependent, have needed for many years a larger and more reliable link in their transportation facilities than the present overburdened ferry system. There is no room for the expansion of the existing ferry service, and the transportation business of the waterfront has vastly outgrown its present facilities. To overcome this lack of transportation the new interstate tunnel was proposed and is now actually under construction.

Although the total cost of the undertaking is estimated at $28,669,000, it has been shown that with reasonable tolls the tunnel will not only pay its maintenance but within 12 years will pay its entire cost of construction, and by the end of 20 years there will be a surplus of more than $66,000,000 to be divided between the states of New York and New Jersey.

The essential features of the proposition are the construction of twin tubes of cast iron, 29 feet in external diameter, larger than any existing American sub-aqueous tunnel of the shield-driven type. The mean length of the cast iron ring section will be 6,600 feet, and the distance between grade points of the tunnel—which includes the open-cut approaches—is 9,300 feet. There are to be two ventilating shafts on each shore to take care of the removal of obnoxious exhaust gases from motor vehicles. The ventilation problem has been one of the most difficult of solution in connection with the tunnel project.

The tunnel will run from Canal Street, New York, a wide east-and-west thoroughfare which is approximately at the center of down-town traffic over the Hudson ferries, to a point almost directly opposite on the New Jersey shore, thus giving a tunnel of minimum length. The New Jersey terminus is near the center of traffic and affords direct communication with Jersey City Heights and points beyond, and the waterfront and railroad yards are easily accessible.



PROFILE AND PLAN OF THE NEW YORK-NEW JERSEY TUNNEL, WORK ON WHICH IS ALREADY UNDER WAY

In determining the traffic capacity of the tunnel, the chief considerations were: (1) volume and character of the vehicular traffic which will seek the tunnel; (2) capacity of one, two and three lines of traffic in each direction; (3) economical size of tunnel in relation to amount of traffic; (4) limitation of traffic by street congestion in vicinity of tunnel entrances and exits. A careful study of the average daily traffic based on 24-hour counts made at the ferries was 12.2 times the maximum hourly traffic. A study of conditions showed that a two-line tunnel—that is, four traffic streams—will have sufficient capacity to accommodate all traffic of motor as well as horse-drawn vehicles

up to the year 1935, and if horses were eliminated during rush hours its capacity would not be reached until 1937.

To determine the proper dimensions of the tunnel, measurements were taken of vehicles crossing the Hudson River on the ferries between New York and New Jersey, and it was found that their height varied from 6 feet 6 inches for passenger cars to a maximum of 13 feet for large loaded trucks, but that the number exceeding 12 feet in height was not over 1 per cent. It was also found that the width of motor vehicles varied from 6 feet for passenger cars and light trucks to a maximum of 10 feet 6 inches for army transport trucks. In the case of three-horse teams, the outside dimension of three horses abreast was found to be 9 feet, but the number of vehicles exceeding 8 feet in width is only 3½ per cent.

Motor truck manufacturers suggested 12 feet 2 inches as the greatest distance between the road and the top of the truck body, and 8 feet as the greatest width of the body. To provide for all contingencies, such as unevenness in the surface of the roadway, spring action of vehicles, and allowances for jacking up in case of breakdown, the clear headroom of the tunnel was fixed at 13 feet 6 inches.

With the tunnel carrying two lines of vehicles in the same direction on one roadway, the normal operation conditions are as though there were one vehicle 8 feet wide in the slow line, and one 6 feet wide in the fast line. There may be times, however, when there will be 8-foot-wide vehicles operating in both the slow line and the fast. In the slow line of the two-line tunnel vehicles operating at a speed of 3 to 6 miles per hour should have a clearance of not less than 6 inches between the outside of the tire and the curb, while in the fast line, on account of the greater speed, this clearance should be not less than 1 foot. Allowance is made for a minimum clearance of 1 foot 9 inches between the moving vehicles, and the minimum width of roadway is 19 feet. For safe and convenient operation, however, a clearance of 2 feet 9 inches between the moving vehicles should be provided, giving a 20-foot width of roadway for two-line traffic, which has been provided.

The problem of ventilating the tunnel has been investigated under three main subdivisions: (1) amount and composition of exhaust gases from motor vehicles; (2) dilution necessary to render these exhaust gases harmless; (3) method and equipment necessary for adequate ventilation. After very thorough study the tunnel has been designed with four ventilating shafts, two of which, 3,400 feet apart, are located near the pierhead line, and the other two between these shafts and the portals. With this arrangement, cost of operation is reduced to about one-quarter of what it would be if the tunnel were provided with only two ventilating shafts at the bulkheads. All fans and motors are to be located in structures at the top of the ventilating shafts, and will be of standard sizes. The fresh-air duct is to be located between the roadways and the exhaust duct above, in accordance with the results of experiments conducted in 1916 by the Public Service Corporation of New Jersey.

Work has already begun in digging the shaft for the tunnel, and contracts are being let gradually, in order to take advantage of the possible reduction in labor and material costs within the next three years.

Data Sought by the Hospital, Library and Service Bureau

The Hospital, Library and Service Bureau, 22 East Ontario Street, Chicago, Ill., has been organized by national hospital, public health, nursing, social service and other organizations, aided by the Rockefeller Foundation. It will serve gratuitously those persons interested in the construction, equipment and operation of hospitals, sanatoriums, dispensaries, health centers, and institutions of like nature. Those interested in the material which is being collected by this bureau may secure a tentative outline on request to the above address. Attention is particularly called to the fact that very little information has been collected as yet, and the coöperation of all agencies is sought in adding to the material on file in order that greater use may be made of it by all health agencies.

Present Methods of Concrete Road Construction

General Data for Public Officials

STRICTLY speaking, there have been few actually new developments in the construction of concrete roads during the past season. Certain new adaptations or uses of equipment have been found which have been in existence before. The year was largely occupied by contractors and engineers in trying out and studying the results of various types of equipment.

Letting Contracts

Perhaps the most interesting and most striking new development has been the change in ideas regarding the letting of contracts for road construction. There has been a general tendency toward awarding more contracts during the winter months. This winter may not see so many contracts awarded as is perhaps desirable, but a definite beginning in this manner of contract letting is being made. During the entire month of January, 1919, there were awarded 268,782 square yards of concrete pavement, while reports for the month of January, 1920, show the award of 1,973,193 square yards.

There are many advantages in this idea of contract letting. Contractors are able to plan their equipment for the work which they have on hand during a season when work outside is impossible. In turn, the manufacturers of this equipment are enabled to gage their markets, and they have a longer time, before good construction weather begins, to fill their orders for road machinery. While not all of the aggregates for road building can be shipped and stored at the site of the improvement during the winter months, because of the difficulties in washing and in shipping freshly washed material, the aggregate producers have ample opportunity for making improvements and additions to their plants so as to take care of orders as soon as the season for shipping opens. In a great many cases these producers can operate throughout the cold weather and store their material ready for shipment at the proper season. Finally, the delivery situation is very much simplified because open-top cars, in which aggregates are most frequently shipped, are available during the early months of the year for this type of work.

THE MECHANICAL TAMPPER AND FINISHER

There has been some thought given by officials and contractors in different parts of the country to the form which a contract should take. While a great many contractors favor the cost plus a fixed percentage contract, others of excellent repute do not like this form of contract at all. As one large contractor has said, "Immediately it becomes known on the job that the contract is cost plus, even the mules on the job learn to loaf." There is a definite tendency toward the development of a contract in which the bidder itemizes the unit prices of

THE HAND ROLLER FOR SECURING A DENSE SURFACE

each item entering into the finished work, with the exception of labor. In this manner, should the cost of any material fluctuate up or down, the contractor is protected and the public profits by the reduction, or bears the expense, as the case may be. In the ordinary form of contract the bidder must consider the possibility of a change in prices, and, in a period of rising markets, to protect himself against an increase in the cost of the work he must bid accordingly higher. In other words, the contractor must often assume a risk and charge accordingly.

Purchasing Materials

One question which has received a considerable amount of discussion is the matter of the purchase of the material in the state highway contracts. A number of states now purchase one or more of the ingredients entering into the construction of roads and supply it to the contractor. The usual idea of the contractors in regard to this practice is that the contractor should be allowed to buy all of his materials in the open market. The contractor is frequently in a position where instant action is necessary to get a delivery of material. Delay costs him a great deal of money. The contractor in many cases can by paying a certain premium for the purchase or on the delivery of material save a far more costly delay which would be caused by having his equipment idle.

Inspection at Source

The quality and the grading of aggregate are designated in the specifications under which the contractor works. It is often the case, however, that a shipment of material when it arrives at the job does not come up to the specifications in one respect or another. In this case the inspector on the work condemns the material, and it must be taken away. There is a definite tendency toward the placing of an inspector at the plant which is the source of material, to see that the grading is correctly done and the material up to the specifications in every manner before it leaves the plant. This method of inspection is resulting in economy for both the contractor and the state, county or other agency letting the contract.

Size of Aggregate

The fact that a number of states and counties are increasing the larger limit in the size of coarse aggregate is particularly interesting. Actual consideration has shown that the pavement built with aggregate containing the larger sizes is as good as, and sometimes superior to, that built of the ordinary standard size. The aggregate producers favor this change in specifications because it will materially reduce the cost of the finished product. There is less wastage of stone at the plant and at the quarry when the larger sizes can be used.

Use of Bulk Cement

During the past season the firms having large road contracts have been handling their cement in bulk form almost entirely. This manner of shipping cement has proved necessary in the operation of a large construction plant. The cement is more easily handled with the same equipment that is used for the coarse and fine aggregates, namely, the clam-shell bucket; and the en-

tire central proportioning or central mixing plant is better organized without having to follow the laborious method of handling cement in sacks. One very important item is the large amount of capital which is tied up in the use of cement sacks. Sacks are costing more and more to manufacture, and there is always a large percentage of lost sacks.

Use of Finishing Machines

While the finishing machine for concrete pavements has not been a definitely new development of 1919 or 1920, its use and operation have been outstanding features of the construction season. In the state specifications covering 1919 work, only five permitted the use of the finishing machine; in those of 1920 twenty states permitted machine finishing. In Illinois the work of the machine has proved entirely successful and the specifications are to remain in effect. Wisconsin has not mentioned the use of the finishing machine in her state specifications, and at a conference between contractors, material dealers, equipment manufacturers and state highway engineers definite statements were made to the effect that until the results from using the machine were proved entirely successful in other places, this method of finishing would not be specified. On no known contract has the capacity of this machine been approached. The apparatus is idle a considerable portion of the time of each working day.

The roller-and-belt method of finishing has been followed in practically every state in the country on both large and small jobs. The performance of this apparatus is already known to be perfectly satisfactory.

Balance of Plant Necessary

No matter what type of equipment or plant layout the contractor uses, from the smallest road contract to the largest, there is need for perfect balance of every part of the plant. A mixer of large capacity cannot justify its existence on a piece of work unless the materials reach it so as to keep it busy constantly, and unless the finishing behind the mixer can keep up with its performance. In addition to a balanced equipment, there must be constant attention paid to keeping each item in perfect repair. A breakdown of any part causes an unbalancing and breakdown in the entire system. A repair crew under the direction of a master mechanic, and a complete stock of repair parts, are of vital necessity on every job.

There is work for this repair crew, or at least a portion of it, throughout the entire winter season. Every part of the equipment needs overhauling and to be put in perfect shape for consistent work for the coming season. There are improvements that the contractor will find necessary, and parts of equipment which he can build, or at least remodel, in his own shop. Every

FINISHING THE SURFACE BY HAND BY THE BELT METHOD

PROTECTING THE NEWLY FINISHED ROAD WITH CANVAS ON LOW FRAMES

part of the entire plant should be in perfect order and ready to start the season without the usual details which so often occur.

Central Mixing Plants

During the past two seasons in the larger contracts the method of preparing the correctly proportioned batch at a central plant was followed. In some cases this batch was hauled to the mixer on the road and there mixed and placed on the subgrade. In other instances the batch was mixed at the central plant and hauled wet to the subgrade and there dumped. No definite lines can be drawn to show the size of the contract on which the industrial railway hauling a dry or wet batch is more economical than hauling by truck. No outstanding features in favor of or against the hauling of a mixed batch of concrete over a distance of several hundred feet to more than a mile have proved that it is better or worse than any other method. Each of the methods has proved satisfactory, but it will take more study and more experience to develop any definite knowledge regarding consistent performance of one method or the other.

Preparing the Subgrade

There are certain construction methods which are known to be proper and which need emphasis. Too much cannot be said in regard to the preparation of the subgrade. Not many actually new methods in subgrade building have been discovered for a number of years. On the other hand, the recognized good methods of building the subgrade have too frequently been left in discard, and the foundation for a costly pavement has been inadequately made. Engineers too frequently forget or disregard the problem of draining the subgrade. The different soils over which the pavement is laid have not been analyzed in a great many cases, and engineers have not always met the problems involved in each type of soil.

Little need be said about the side forms for concrete pavement, further than the necessity for perfect support on the subgrade. The heavy subgrade finisher and concrete tamper and finishers which are coming into wide use must be supported on forms which remain perfectly true to the grade under their weight. The evenness of the longitudinal grade of the finished concrete depends upon the strength of the side forms, the accuracy by which they are laid, and upon their retaining a perfect grade under the weight of the finishing machine.

Testing Concrete and Curing

A great deal has been said about the proper consistency of mix used in concrete pavements. The slump test was developed, by which the amount of water in the mixture was gaged according to the amount of slump in a column of concrete left after the withdrawal of a cylinder. Practical use of this equipment, however, suggested the use of a truncated cone instead of a cylinder, because the concrete was less liable to be disturbed by the removal of the form.

No new methods have been developed in the curing of the finished pavement, but special emphasis should be given to the proper methods, which are well known. During warm weather it is essential that a

canvas cover be suspended over the pavement immediately after finishing it, to prevent too rapid evaporation of the water in the concrete. Then may follow the curing cover, either a layer of water or of wet earth, which remains on the pavement for two weeks or longer.

Concrete Roads Must Be Maintained

Maintenance of pavement is too often done in a dilatory manner or is completely forgotten. Concrete roads need regular maintenance, as does every other type of pavement. This maintenance consists chiefly in filling the joints and cracks with bituminous material, which prevents the passage of moisture to the subgrade. This operation should be performed regularly as early in the spring as the work can be done to advantage, and late in the fall. It should be done regularly at these intervals and at such other intervals as are found necessary.

It is doubtful if there are any bad practices in the present methods of building concrete roads which should be eliminated. Rather there are certain practices which need improvement. In general, these are as regards the supply, training and salaries of the engineers, the improvement of the practice in awarding contracts, and the development of material supplies.

During the coming years the road-building program is going to demand an increasing supply of engineers. These men will need training. It will cost them a great deal of time and expense in securing this training. After they have secured it, the positions into which they step should carry with them salaries which are at least commensurate with the ability acquired and the responsibility involved by the position.

It is evident that material deposits will often be found from which the aggregates for road construction can be supplied, if surveys are made in the regions where projects are to be built. If these deposits are developed, the cost of the aggregate on the job should be lower than when shipped long distances. This applies, however, only in cases where established plants cannot economically compete with local deposits, because of shipping facilities or because of the character of the material which they handle.

CURING A CONCRETE ROAD BY PONDING

The Need of Hospital Service for Rural Communities

Attention must be given to the relation of the rural hospital in a general community health program to other programs of local government and welfare service. The hospital represents merely one factor in public health work and private medicine. Public health work again is but one factor in the general program of public administration. One must needs keep in mind that funds must be provided by a community for the financing of all its various public services; for the general government purposes of the legislative, executive and judicial departments; and for the special services of protection of persons and property, of education, of recreations, of charities and corrections, of highways, and last, of health, sanitation and hospitals.

Street Lighting in City and Town

By Reginald Trautschold

EVEN less than a decade ago, street illumination was almost wholly for utilitarian purposes—to discern large objects and surface irregularities in the street and on the sidewalk, and comparatively little was accomplished in the way of ornamental street lighting, as modern street illumination has quite generally become termed. The commercial and artistic aspects of the question could almost be said to predominate, for the actual money value to a town or city of well-lighted streets has been shown repeatedly by the great increases in commercial and real estate values of brightly illuminated business sections and of harmoniously and properly lighted residential districts. Civic pride is concerned, for a city is often judged by its first impression on strangers, and there is the gain in safety to pedestrians, traffic and property which proper illumination invariably engenders.

The question of safety alone would suffice to warrant the importance now placed on adequate and plentiful street illumination. To conserve coal during the war, most communities drastically reduced street illumination, with rather unfortunate results so far as lawlessness was concerned and the number of accidents attributable to lack of sufficient light. In Cleveland, accidents directly chargeable to lack of daylight—i. e., those customarily occurring after dark—increased some 37½ per cent when the lighting was cut down. In the metropolitan district of New York the number of people killed at night increased 73 percent, and the number of injured 21 per cent, from 1913 to 1915.

Adequate and proper lighting is highly important to all communities, large or small, and it has been made possible in large measure by the development of electric lighting. Good street illumination may not be wholly attributable to the use of electricity, for there have been some installations of gas street lighting which have been and still are reasonably modern, chiefly in the smaller towns in residential communities, but it is certain that electric lighting predominates and is, as a rule, the convenient and economical system to employ.

Systems of Electric Street Lighting

Two systems of electric street lighting are in quite general use—the arc light and the incandescent—and it would not be fair to say that the modern incandescent street lamp has or will immediately supplant the older arc light, despite the numerous advantages which the former possesses. Both systems have their fields. The arc lamp, which has been improved greatly since its commercial introduction about 1880, maintains a certain place for itself where powerful sources of light are required, by virtue of its efficiency in lumens per watt consumption, and sometimes the more yellowish light of some arcs is considered an advantage. The most efficient and useful arc lamp for street lighting is the direct-current, series, luminous or magnetite arc lamp, either in the pendant or upright (ornamental) type. It is economical to maintain and reliable in operation, consuming about 500 watts and giving a total illumination of about 1.8 times that of a 100-candle-power, modern, street series incandescent lamp. The average cost of operating such an arc lamp is approximately the same as that for a 1,000-candle-power street series incandescent lamp. Diffusing and distributing glassware is used to moderate the glare of arc lamps, as it is with high-power incandescent lamps, but even with such aid the use of arcs is now pretty well limited to centers of street intersections and to the middle of broad avenues.

SMALL TOWN BUSINESS STREET WITH ORNAMENTAL POSTS AND SINGLE FIXTURES

Now that incandescent street lamps may be obtained in sizes up to 1,000-candle-power, they are used very extensively for general service, where high degrees of illumination are required, as well as where more moderate lighting suffices. They provide moderate power with very good efficiency, and the tendency in public street lighting now is to use the smaller and more flexible types of illuminants, which tend toward simplification of the lighting system and are procurable in a number of sizes. Technical considerations which are of considerable economic moment also favor the use of the modern street series incandescent lamps. The comparatively low voltage at which the series incandescent lamps operate is an advantage. This prevents the excessive heating of the lamp and also allows the use of heavier filaments than in constant voltage incandescent lamps such as are used in industrial and domestic lighting. Though the filaments of series incandescent lamps gradually evaporate in use, this also increases their resistance, so, with the current maintained virtually constant, the current density in the filament is consequently increased, and very nearly uniform intensity of light is maintained during the life of the lamp. This life will average close to 1,350 hours. Carbons of arc lamps, on the other hand, have to be renewed after about 120 hours' operation.

Lighting Circuits

The modern incandescent lamps for street lighting operate on alternating current circuits—the only exceptions being a few isolated plants and some small public-service installations where the conditions of growth have not warranted new and more efficient equipment—with the lamps connected in series, rather than in multiple. The fundamental advantage of series lighting is the economy in the use of copper, but an advantage of even greater importance is the uniformity in the operation of the lights secured by the series connection. In series circuits the same current is forced through all the lamps in the line, while in the case of multiple circuit, which is used for all domestic and industrial lighting, it is the voltage which is supposed to remain constant. This, however, is not entirely possible on a multiple circuit, on account of the voltage drop in the line between successive units, though the loss can be greatly reduced—almost to a negligible quantity—by the use of extra quantities of the expensive copper, so where the distance of transmission is great, as in street lighting, it is much more economical to use the series system.

Alternating current circuits for street lighting are pretty generally standardized at 6.6 amperes—occasionally at 7.5 amperes—and though such current is suitable for the smaller lamps and is used for lamps up to 400 candle-power, greater efficiency is secured with 600- and 1,000-candle-power lamps if the current strength is increased to 20 amperes, the voltage at the lamps being reduced correspondingly. Even in the case of 400-candle-power lamps, a current strength of 15 amperes will increase the efficiency of the lamp. To secure this increase in current strength, compensators are installed next to the lamps of greater power. These compensators, which are

really step-down transformers, also serve another important function. They act as "choke coils" or checks against surges or sudden changes of current strength produced accidentally, through short-circuiting a number of lamps or through the action of other current-consuming elements in other parts of the same circuit. In the case of filament failure, the compensator acts as a cut-out and permits the current to flow in series through the other lamps in the circuits.

For series street lamps of low candle-power which are not provided with compensators, a film cut-out held between the conducting clamps is provided to guard against breaking the circuit should the filament of a lamp fail. The thickness of this film is such that it is an insulator at the normal voltage of the lighting circuit, but when a lamp filament fails, the voltage piles up and punctures the film, establishing a short circuit, or by-pass, which allows the current to pass on through the lighting circuit as before, without passing through the damaged lamp.

Selection of Lamps

When electric street lighting was first taken up with a view to beautifying the street, as well as for the more practical purposes of proper street illumination, the tendency was to use ornamental fixtures with clusters of comparatively low-candle-power lamps, each in a diffusing globe mounted on decorative standards some 10 or 12 feet high. This practice has been greatly modified since the high-power incandescent lamps for street lighting have been available, and now the standard with a single powerful light promises to supplant the more elaborate equipment. The single-light standard can be more widely spaced, and this reduces the expense of maintenance. The poles, compared to those of cluster standards, are slender and graceful and therefore less conspicuous. They lend themselves to more artistic treatment and harmonize better with the architectural surroundings, but the chief advantages of the single-light arrangement are very practical.

The efficiency of the single light is very much higher, for the light from several lamps in a cluster is reduced by interference between the various globes and the pole itself. Each globe not only absorbs light from the lamp within, but also obstructs light from all the other lamps. The loss in many cases amounts to 15 or 20 per cent. In fact, it is claimed that a 20 per cent increase in light with a saving of 10 per cent in wattage can be secured by the use of single large lamps.

In the question of light distribution, the single light also shows up to decided advantage, for though the downward illumination is very nearly the same for both arrangements, the upward illumination is nearly 50 per cent greater with the single light. Initial cost and maintenance expenses are naturally much lower with the simpler standard, and the single light is much more flexible, as refractors, globes and reflectors can be provided to throw the light in any desired direction, an arrangement not feasible, as a rule, when there are a number of individual lights.

CHARACTERISTICS OF MAZDA SERIES LAMPS

Nominal Rated Candle-Power	Total Lumens	Watts Consumed	
		6.6 Amperes	7.5 Amperes
40	400	35	36
60	600	46.8	48
80	800	60	60
100	1,000	72	72
250	2,500	155	147
400	4,000	244	228
		Lamp Amperes	Watts at Compensator
400	4,000	15	210-245
600	6,000	20	297-330
1,000	10,000	20	475-544

Street Lighting Systems

As illumination requirements are rarely comparable in even quite similar localities in cities and towns, it is quite impossible to advance rules or even definite recommendations incorporating the advisable candle-power of lamp, type of reflecting, refracting and diffusing equipment, spacing of posts and height of lamps, that are not susceptible to such modification as to be of really little value. However, as in most cities, towns and even villages there is the important business district, the less important business streets adjoining, possibly a factory district, important and less important residential streets and quite probably parks, some indicative guide for the district

can be made. This classification of streets or districts can, of course, be greatly expanded, but it will serve to indicate that there are roughly six classes of streets the lighting requirements for which will vary in every city or town of fair size, the intensity of the desirable illumination decreasing with the importance of the street for business purposes in the order mentioned.

The spacing of the lighting standards will vary between quite wide limits—say between 50 and 100 feet, or even more; the wider the street, the closer should be the standards. This introduces the question of whether the lighting standards should be placed along the center of the street, as is done on some wide boulevards and avenues, or, if placed along the edges of the roadway, whether the lights should be placed opposite one another or the staggered arrangement adopted. As far as lights skirting the roadway are concerned, a general scheme which tends to a harmonious and decorative layout is to place the lights opposite one another when standards are set at each of the four corners of intersecting streets and to stagger them when lights are located at two diagonal corners. The mounting height of the lights should be adequate to keep all powerful rays of light out of the plane of vision, even when—as should invariably be the case where high illumination is employed on important thoroughfares—diffusing media are employed.

The illuminating systems of important cities naturally serving as criteria for the lighting of other communities, it may prove of interest to record the present standard of New York in this respect. As an indication of the cost of illumination, the power of the lamps used will be given in watts, a 500-watt lamp of the street series incandescent type giving approximately 1,000 candle-power. On the brightest streets, 500-watt lamps are used, mounted 20 feet above the road. On car streets and wide avenues the standard lamps are 400 watts, mounted at the same height. On the avenues where the traffic is not so heavy, 300-watt lamps are used, the 20-foot height being general. Residence streets are lighted by 200-watt lamps placed about 16½ feet above the sidewalk, or by 100-watt lamps at a height of 14½ feet. The lighting of the parks in New York has been pretty well standardized. The lights are staggered on either side of the roadway, 80 feet apart, mounted at a height of 10 feet, and are of the 100-watt size. In Cincinnati, another well-lighted city, the general scheme is to place the lighting standards opposite one another at 80-foot spacing, with the lamp filaments 13 feet 4 inches above the road-bed.

Typical of good lighting practice as are these arrangements, they fail to convey a proper application of the degree of illumination attained. In New York, the illumination on a plane 4 feet 8 inches above grade, the average intensity in well-lighted streets is 0.135 candle-power, with a maximum of

LIGHTING SCHEME FOR A HEAVILY SHADED STREET WITH SERIES INCANDESCENT LAMPS ALONG THE CENTER OF THE ROAD

0.96 and a minimum of 0.021 candle-power. On other brightly lighted business streets the intensity of illumination varies from 0.015 to 1.04 candle-power, with an average of 0.185, while on still others the range is between 0.010 to 0.75 candle-power, with an average of 0.135. Well-lighted residence streets have an average illumination of 0.068 candle-power, the maximum and minimum being 0.347 and 0.0102 candle-power respectively.

Lighting Residential Districts

In the lighting of many residential districts, the presence of shade trees and the desire to secure as uniform illumination of them as possible often makes it necessary or advisable to use only small-size lamps. Decorative considerations make it customary to place the lights in opal balls mounted on ornamental posts, with the result that a large amount of the light is thrown upward and so lost for lighting the street. To avoid this drawback, approved practice is to employ prismatic reflectors to collect the upward rays of the small lights—usually 100-candle-power lamps—and redirect the light outward at a slight downward angle. These primatic reflectors consist usually of a double concentric band with smooth outer and inner exposed surfaces, with prisms on the two inside surfaces, sealed at top and bottom to exclude dust and dirt.

Lighting Country Roads

For rural highways the lighting fixtures are usually of the comparatively inexpensive variety with the lights and reflectors mounted on long mast arms over the center of the street. As it is impossible to secure any degree of uniformity in light intensity, owing to the necessarily wide spacing of the lights, the silhouette principle with direct illumination should be employed. This scheme provides a light background against which objects intervening on the ground stand out in bold relief, like the daguerreotypes of the days of our forefathers. In some cases, prismatic refracting glassware of the bowl type can be used to good advantage to enhance the intensity of light immediately beneath the lighting unit, so securing more light directed on the road surface in the vicinity of the unit and a more nearly uniform light intensity over the entire, but limited, lighted area. The lighting of interurban highways is quite customarily performed with twenty to twenty-one lamps per mile.

A typical lighting fixture for country roads consists of a 20-inch radial wave reflector street-hood body furnished with a diffuser. Such a unit may be used with lamps as large as 600 candle-power, consuming approximately 350 watts.

Costs

No discussion of street lighting—even one as necessarily sketchy as this—can make any claim of being constructive without some mention of the all-important costs of street illumination. Obviously, no detailed figures can be advanced—so much depends upon the design of the lamp posts, etc.,—but some very general figures will serve as an indication of what the average installation of modern ornamental street lighting actually costs. Based on an average spacing distance of 70 feet for lighting standards, the installation cost per standard will average not far from $100, and the yearly cost of operation and maintenance should not exceed $50 or $60 in normal times. Considered in the light of the benefits to a community in enhanced business value of well-lighted streets, the safety to its citizens, and the attractiveness of its streets after sunset, this would indeed seem a trivial sum to pay.

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Motorization Reduces Complaints Regarding Garbage Collection

Under the contract system of garbage collection an average of 200 complaints were received each day, while under municipal collection with trucks and trailers only 10 are received each day from the 70,000 homes served in Indianapolis. One truck has proved to be the equivalent of three wagons and accomplishes in an hour and a half the equivalent of a day's work for a horse. Between 90 and 100 tons of garbage are collected daily.

Considerations Governing the Design of Pavements for Heavy Traffic

By Prévost Hubbard
Chemical Engineer, The Asphalt Association

THE load-carrying capacity of any type or design of pavement must of necessity be influenced by the support afforded the pavement from below. Such support is furnished by that portion of the earth directly below the pavement, known as the subgrade. The supporting value of natural subgrades varies enormously, as illustrated by the two extremes of muck or quicksand and solid rock. Most subgrades consist of soil lying between the extremes mentioned but still varying greatly in supporting value, depending not only upon type but upon their moisture content and degree of compaction. With very few exceptions, any well-compacted soil will of itself support the heaviest conceivable traffic if its moisture content is properly controlled and if it is protected by a structure which prevents the displacement of particles at its surface. The protective structure termed the pavement will then need to be only of sufficient thickness to afford such protection and at the same time itself withstand the various destructive agencies of traffic. For a given traffic, this thickness will depend largely upon the type of pavement used.

The bearing capacity of most soils, particularly the clayey types, decreases as their moisture content increases above a certain point. Although there is much yet to be learned regarding the comparative bearing value of soils, this fact is generally recognized, and various drainage methods are employed to control the moisture content of the subgrade. Proper drainage is the first essential for maintaining a dry subgrade, and measures taken to prevent access of water to the subgrade directly below the pavement are often more important than measures designed to remove accumulations of water in the subgrade. Some soils are so persistently retentive of moisture once absorbed that it is impossible to remove it with sufficient rapidity by any ordinary system of drains. Certain clayey soils belong to this class, and when all practical preventive measures in the way of drainage are apt to prove inadequate, it may well be advisable to modify the character of the subgrade material. Thus, at relatively low cost a clay subgrade may often be greatly improved by mixing it with sand in exactly the same manner as in the construction of a sand-clay road. Such a mixture will not only retain less moisture than the clay but will possess a much higher supporting value than moist clay.

Uneconomical Design

It is now generally admitted that in the past too little attention has been paid to drainage in the construction of pavements outside of municipalities. At the same time there exists a marked tendency to increase the massiveness of design to a point far beyond that which is at present proving entirely satisfactory for heavy traffic in municipalities and in other places where subgrade conditions are favorable. This matter should receive the most careful consideration of engineers, as it points not only to the most logical but also the most economical solution of the design of pavements. It is evident that in many cases it will cost far more to increase the thickness of a pavement to such an extent that the load will be distributed sufficiently to enable a poor subgrade to support it, than it would be to change natural subgrade conditions so as to create a high supporting value for the relatively thin pavement.

The widespread use of rigid pavements, or pavements with rigid foundations, has been largely responsible for this trend in paving design, through too great dependence upon the bridging value of such rigid types. Right here exists a rather anomalous situation, for while many claims are made of the bridging value of rigid pavements, it is generally admitted that careful preparation of the subgrade is necessary to uniformly support these rigid types. As a matter of fact, it is impracticable to design a highway which will permanently bridge appreciable areas of a weak subgrade when subjected to modern heavy traffic.

In pursuing a policy upon which general

attention has once been centered, many who are interested in highway construction are apt to overlook the experience of others following different lines of development, and fail to profit by their experience. One of the most striking examples of this has to do with the flexible type of construction as represented by the asphalt base pavement, and this in spite of a number of valuable papers and discussions upon the subject by leading engineers. Citations of past and present experience in localities other than that of interest to the individual engineer apparently carry little weight once the majority concentrate on a given line of development, and it is difficult to focus attention on any other line for the time being.

Remarkable Facts

To state that considerably over 12,000,000 square yards of asphalt base pavement are now giving satisfactory service in California and Oregon, many of them 5 inches or less in total thickness and subjected to heavy motor traffic, and that some of these pavements have been in service for over 20 years with little or no cost for maintenance, should at least arouse some degree of interest on the part of eastern engineers. To further state that in such cities as Washington, D. C., Chicago, Omaha, Pittsburgh, Buffalo and Denver, there are in existence sections of bituminous base which have given satisfactory service for over 20 years, should also serve to dispel any illusion that the serviceability of this type is restricted to any given locality.

Service results should in themselves be conclusive, but explanations of such results are sometimes required before their full significance is grasped. It is true that theories have been advanced, but these have not been backed up by test data in such a way as to make them convincing. Some degree of cushioning effect under traffic has been claimed and admitted for the asphalt base as well as the wearing course, but few engineers have believed that a mineral aggregate cemented together with asphalt could possibly possess any slab strength or beam strength, at least to an extent comparable with the rigid type of construction.

The Effect of Impact

With this in mind, an investigation was begun under the direction of the writer assisted by W. E. Rosengarten, Traffic Engineer of the Asphalt Association, to determine certain relations that exist between the rigid and flexible types of construction. Fortunately, through the very valuable work of the U. S. Bureau of Public Roads it has already been proved that impact and not dead load is the most destructive traffic factor to be taken into account in the design of modern highways. It was therefore decided to limit these investigations to a study of the effect of impact upon test specimens having thicknesses equivalent to those commonly used in the construction of highways. It was clearly realized in advance that it would be impossible to duplicate all the variable conditions under which impact is delivered to a pavement by traffic, and it was therefore decided to confine this study to the effect of pure impact as delivered by an iron bar falling from a relatively small height.

In order to obtain comparisons at two extremes of conditions, it was decided to construct and test slabs of various design upon a solid uniform subgrade and to test beams of the same design supported only by knife edges.

Testing Slabs on a Solid Uniform Subgrade

A plot of ground was secured and upon this was laid a 6-inch course of cinders thoroughly compacted by rolling. Slabs 3 feet square were constructed directly upon this subgrade, except that after the forms had been placed, the subgrade within the form was leveled up with a very thin layer of sand so that each specimen would have a uniform thickness throughout. Portland cement concrete slabs were cast 4 and 6 inches thick, of a 1:3:6 mix. These were cured under a cover of moist sand after they had set. Some of the concrete slabs were then covered with from 2 to 4 inches of coarse graded aggregate asphaltic concrete, and some with sheet asphalt with and without a binder course. In addition, slabs were constructed of asphaltic concrete base mixture and covered with either asphaltic concrete surface mixture or with sheet asphalt so as to produce total thicknesses directly comparable with the Portland cement concrete base specimens. At the same time corresponding sets of beams 4 feet long and 10 inches wide were constructed of the same type and thickness. In general, the specimens were tested when the concrete was 28 days old, although in a few cases they were

slightly older when for one reason or another it was found impossible to keep up with the testing schedule which had been planned.

All slabs were tested where they had been cast, by means of a machine which was designed and operated so as to drop a 125-pound iron ball upon the center of the upper surface from a height of 6 inches at the rate of about 30 blows per minute. In all cases a specimen was considered to have failed when the first crack appeared. Cracks in the Portland cement concrete were invariably first noted developing on one or more sides of the specimen from the plane of contact with the subgrade. Under continued impact these cracks traveled to the upper surface of the monolith and then across the upper surface toward the center. The all-Portland cement concrete specimens broke into two to four large fragments shortly after the first crack appeared, while similar slabs with an asphalt top showed no cracking of the top after the base had failed. The results obtained on check specimens were in some cases erratic, in others quite close together. By averaging results, however, the general trend is apparent and is closely borne out by results obtained on the beam specimens.

The following diagram shows the resistance to impact of the various types of slabs as measured by the number of blows required to produce failure. The dotted extensions of the asphalt tops on slabs with a Portland cement concrete base show the number of blows at which the test was stopped, no failure of the top then being apparent.

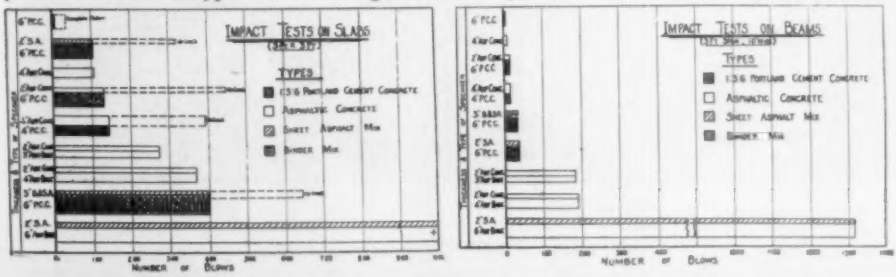
Testing Beams Supported by Knife Edges

The beams were tested upon steel knife edges 3 feet apart with the same machine used for testing the slabs, but with a 50-pound iron ball dropped from a height of 1½ inches at the center of the span at the rate of about 50 blows per minute. The number of blows required to produce the first crack was recorded as point of failure. In all beam tests complete failure occurred within a very few blows after a crack appeared. The results of these tests are shown in the second diagram in the same manner as the slab tests.

In considering these diagrams no attempt will be made to draw conclusions based upon a comparison of absolute values as here shown; in fact, it is frankly admitted that such a course would be unwise until many more test data are available. It is believed, however, that the general similarity in trend of the results obtained in both the slab and beam tests are highly significant and point to interesting facts. What is clearly apparent for conditions under which these specimens were tested may be summed up as follows:

Asphaltic mixtures develop very decided slab and beam strength as measured by their resistance to impact. The all-asphalt type of slab and beam appears to offer considerably more resistance to impact than an equivalent thickness of 1:3:6 Portland cement concrete, considered either as an integral structure or as a base for an asphaltic top.

It is recognized that, unsupported by practical service results, deductions drawn from these tests might not be conclusive as applied to the design of highways for heavy traffic. They do, however, help to explain the remarkably satisfactory service record of the millions of square yards of 4- and 5-inch asphaltic concrete pavements in California and Oregon, and point the way to a more rational development in the design of highways in other localities. In summing up the substance of this paper, there are a few points which the writer wishes to em-



RESULTS OF IMPACT TESTS ON SLABS AND BEAMS OF DIFFERENT MATERIALS

phasize:

Points of Emphasis

1. Any rational design of highway should take into account the fact that the subgrade must ultimately take the weight and shock of traffic as transmitted through the pavement, and practically any reasonable dry subgrade will do this if it is compacted and its surface is protected from displacement. Careful attention to subgrade preparation and drainage is therefore the first essential to be considered.

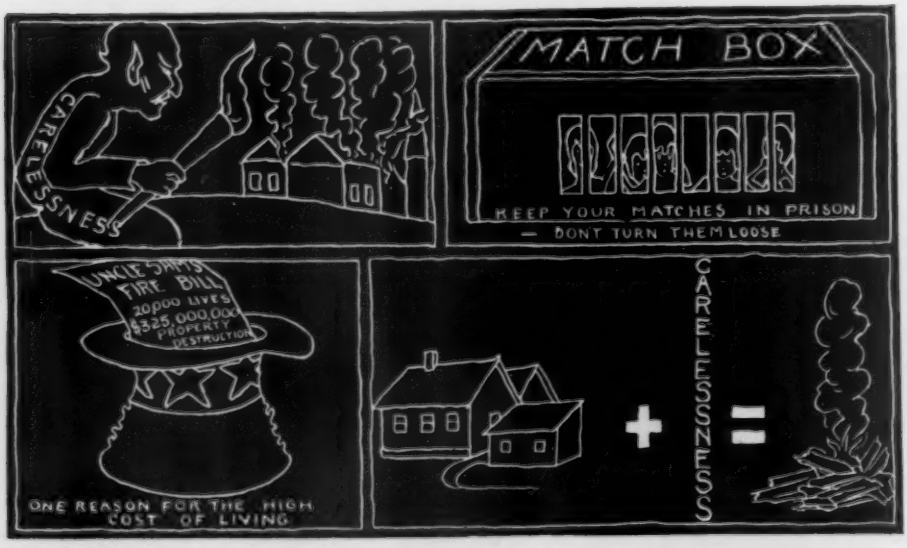
2. The asphaltic concrete pavement is highly resistant to impact, which is recognized as the most destructive traffic factor, and under impact develops as a single unit relatively high slab and beam strength.

3. It is manifestly uneconomical, if not impracticable, to adopt a design of highway which will permanently bridge appreciable areas of weak subgrade. While the asphalt type develops bridging action to an appreciable extent, it will of itself constantly seek to maintain contact with the subgrade at all points and thus reinforce itself with the maximum supporting value of the subgrade. The rigid type of pavement or base cannot do this because of its inherent characteristics. It is therefore almost sure to crack eventually where appreciable areas of subgrade fail to support it uniformly.

4. Both the service history of asphalt base pavements and the test data here presented indicate that under given conditions it is not necessary to adopt as massive a design for the flexible type of base as for the rigid type. It is difficult for engineers who have had no opportunity to observe the asphalt base pavement under heavy traffic to think of it in terms of less thickness than the rigid base, but in the light of present experience such consideration appears to be entirely warranted.

Acknowledgment.—From a paper presented before the Engineers' Club of Philadelphia, December, 1920.

Teach Fire Prevention in the Schools



Courtesy of the National Board of Fire Underwriters

BLACKBOARD CARTOONS FOR THE SCHOOLROOM

Almost every schoolroom contains pupils with some talent for drawing. The simple cartoons shown above may be copied by them upon the blackboards and will aid in impressing the lessons of the day

The Municipal Refuse Destructor at Montevideo, Uruguay

A Successful Experiment in New Principles and Design

By Robert Balmer
Sanitary Engineer, New York and Buenos Aires, Argentine

IN 1915, after an open competition in which a number of the best-known European destructor firms had taken part, a Special Committee of 19, including the Mayor of Montevideo, Uruguay, all the Commissioners of Department, and a number of prominent engineers and sanitarians, recommended the erection of a Balmer refuse destructor. After the preliminary surveys and the preparation of the site, the work of construction was begun, and it was concluded within five months, on August 25, 1915. One month more was taken up with drying out and warming up the batteries; then came an official test of two months' duration, under the supervision of the author, which demonstrated a normal excess of 66.6 per cent over the contract stipulations.

LOOKING TOWARD THE RESIDENTIAL PORTION OF MONTEVIDEO FROM THE DESTRUCTOR
Note the proximity of high-quality residences

Description of Plant

The plant consists of three batteries of three fire-grates each. The original guarantee of 60 long tons per battery was soon exceeded by normal operation at 100 long tons, with reserve capacity to meet any emergency. The public needs are met by two batteries. They proved themselves capable of dealing with the city's whole output of refuse—garbage, ash, rubbish and street sweepings, together with a number of special services, such as cremation of dead animals, condemned food, commercial residuals, etc.

The destructor station occupies a part of the block between Ejido and Cuareim Streets, on a bluff overlooking a handsome boulevard or driveway that skirts the riverside—a conspicuous position, within seven blocks of the City Hall, and calculated to put to the severest test the possibility of nuisance from this system.

Regular service under municipal management began January 1, 1916, immediately after termination of the official trials above mentioned. Early in 1917, the City Engi-

THE FRONT OF THE BATTERY OF FURNACES AT THE MONTEVIDEO REFUSE DESTRUCTOR

neer, H. Millot-Grané, issued the official report for the preceding year. Some brief extracts from that report will demonstrate the character and extent of the service rendered during the first year's working. The report says:

"In table A will be found a resumé of the amount and quality of garbage and refuse received by the destructor during the year 1916, the first year of service. This table shows that the plant, although only a provisional structure built only to test the efficiency of the system, received and destroyed without the slighest inconvenience all the garbage and refuse regularly produced by the city.

"On the other hand, the elimination and destruction of the street sweepings and fish residuals bear testimony to the high crematory power of the batteries."

A GARBAGE AND REFUSE DESTROYED 1916

Cartloads	Character	Total Weight
57,426	Household	64,443,610 Kilos (141,775,942 lbs.)
10,415	Street Sweepings	1,432,250 Kilos (3,150,950 lbs.)
2,175	Markets	2,176,000 Kilos (4,787,200 lbs).
593	Military Barracks	296,000 Kilos 651,200 lbs.)
373	Fish Residuals	186,500 Kilos (410,300 lbs.)
174	Hospitals	174,000 Kilos (382,800 lbs.)
18	Private Individuals	9,000 Kilos (19,800 lbs.) (19,800 lbs.)
56	Residuals from the Port	114,000 Kilos (250,800 lbs.)
152	Various	152,000 Kilos (334,400 lbs.)
71,383 Cartloads with		68,983,360 Kilos (151,763,392 lbs)

"Table B, complementary of the preceding, details some unexpected services rendered by the plant. In this direction, during the present year, an effort will be made to extend these services, making them available to many public and private institutions and, in general, to all those establishments which are interested in quickly getting rid of such refuse as they produce in large quantities."

TABLE B SPECIAL SERVICES

Source	Objects Incinerated
City Dog-Pound	2,980 Dogs.
Animal Sanitary Police	45 Sheep
" " "	12 Cows
" " "	1 Horse
Medical Faculty	13 Animals, Various
Municipal Chemical Laboratory	9 Cases of Foodstuffs
Banks	$5,664,555 in notes, etc.
National Telegraph	6,270 kilos (or 13,794 lbs.) of Duplicates, etc.

"In order to complete these brief notes on the incinerating capacity of the Montevideo destructor, as exhibited during its first year of working, and to give an idea of its intrinsic value, Table D is attached, in which may be seen its capacity exhibited in comparison with the incinerating stations of the greatest scientific importance as yet known, without excepting that of Hamburg, which must be taken as the most considerable effort of modern sanitary technique on the matter of garbage and refuse disposal.

"The above consideration may be concluded by stating that, according to the technical report officially issued under date of September 19, 1916, by the Institute of Industrial Chemis-

TABLE D	INCINERATION PER UNIT				1916
City of	System	Number of Units	Cells per Unit	Daily Output per Unit	Cost of Construction per Unit
Weisbaden	Dorr	6	1	19,500 Kilos (42,900 lbs)	$13,606
Frankfort	Herbertz	6	4	30,000 Kilos (66,000 lbs)	$52,900
Furth	Humboldt	2	1	27,500 Kilos (60,000 lbs)	$17,250
Milwaukee	Heenan	3	4	80,000 Kilos (176,000 lbs)	$69,000
Hamburg	Udhe	12	1	44,000 Kilos (96,800 lbs)	$21,850
Montevideo	Balmer	3	3	*90,000 Kilos (198,000 lbs)	$21,666

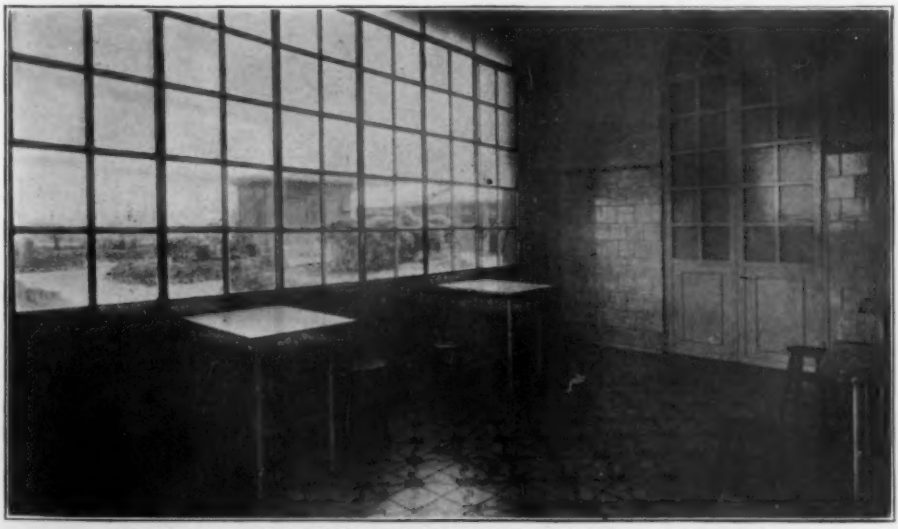
try, the clinker and ash of the Montevideo destructor show a perfect incineration of the garbage and refuse, or, which is the same, an absolute elimination of all organic matter."

"And Table F exhibits the economy with which the plant is operated. In making up this last table, we have taken as basis the actual working budget of the plant, which reaches $28,800 annually, and the cost of amortization and interest on a capital of $65,000, covering the cost of the plant."

"It is desirable to state here that this low cost of construction and operation is due to the mechanical simplicity of the Balmer system. The complicated apparatus and devices which form part of all known systems of destructors do not exist in our establishment. Situated at a low level, the natural action of gravity carries the garbage and refuse down to the fire-grates.

"Another characteristic worthy of mention, as representing the economic nature of our installation, is its central location with respect to the service of collection. The distance of seven kilometers, from the centre of the city (City Hall) to the disgraceful garbage dump

TABLE F	COST OF OPERATION PER 1000 KILOS INCINERATED ANNUALLY (1916)			
City of	System	Annual Cost of Operation with 10% Int. & Mort.	Quantity Incinerated Annually	Operating cost per 1000 Kilos (or long ton)
Zurich	Horsfall	$30,820	20,000 Long Tons	$1.54
Milwaukee	Heenan	81,650	54,000 " "	1.51
Frankfort	Herbertz	67,160	46,500 " "	1.45
Wiesbaden	Dorr	19,205	17,000 " "	1.13
Furth	Humboldt	11,040	12,000 " "	12,000 0.92
Hamburg	Udhe	71,300	100,000 " "	0.71
Montevideo	Balmer	35,000	66,000 " "	0.53



WORKMEN'S REST ROOM AT THE MUNICIPAL REFUSE DESTRUCTOR

of the Buceo, was reduced, in virtue of the new station, to 800 metres. And, in the first year of working, it has been proved that, owing to this more favorable location, it would be possible to reduce to one-half the expense of collection and cartage, and thus effect a monthly saving sufficient to cover the total present cost of working of the station, viz., $2,400 monthly, and to cover likewise the interest and amortization on the capital employed in construction."

Up to the end of 1920, the destructor station has operated without developing its own power. It has now been decided by the municipality to install boilers and an electric generating plant to utilize the heat produced by the furnaces. By the third quarter of the current year, the new power service should be in full operation. It is estimated that each battery will develop a minimum of 400 kilowatt capacity.

Principles of Operation

A brief reference may now be permitted to the underlying principles of the Balmer destructor. These had already been put into practice in the 100-ton destructor of Flores, Buenos Aires; in the 1,000-ton destructor of the Quema, Buenos Aires, and a dozen smaller destructors in that and other Argentine cities. In the Montevideo plant, the same principles have the advantage of the foregoing practical experience, aided by more careful designing and a more esthetic setting, expressive of the new social status of the service.

Fundamentally, and especially in dealing with semi-tropical refuse, where ash is practically non-existent and where garbage constitutes an excessively high percentage, the Balmer destructor depends for its sanitary efficiency on the development and utilization of hitherto unappreciated and neglected elements in the refuse itself. By fermentation of organic constituents, displacement and expulsion of accompanying moisture, volatilization of hydrocarbons, and even oxidation of metals,—all aided by the application of waste heat from the combustion chamber,—a molecular readjustment is effected, which transforms the character of organic refuse to a combustible; its ignition becomes easy, and it develops high temperatures. It is true that, under this treatment in the pioneer installations, some unusual phenomena presented themselves: spontaneous combustion of the refuse in storage, and the production of explosive gaseous mixtures, with violent dilatation in the air-flues and in the furnace itself. These phenomena, while exceedingly inconvenient under the conditions of the first installations, were very convincing signs of the existence of considerable caloric potentials in ordinary city refuse, which only required adequate measures for their utilization to insure a perfect sanitary service and an abundant source of power.

The Collection System Used

It may be noted here that in both capital cities above mentioned, the improvement in the service of final disposal of refuse reacted automatically in the creation of a higher standard for the vehicles of collection and transport of the refuse. A covered type of van was at once developed, which effectually kept the refuse out of sight and provided shelter for the driver in all weathers. The service became less an ocular and olfactory offense, and soon gained the toleration and then the respect of the average citizen.

Assessments for Street Sprinkling

IN Hartford, Conn., it is customary to assess the cost of street sprinkling or oiling or flushing, as the case may be. The cost for this work for the fiscal year ending March 31, 1920, was $61,538.61. The rates charged were 6 cents per foot frontage for paved streets flushed every night and 4 cents for paved streets flushed less than every night, and 4½ cents for macadam streets. In all, 111 miles of streets, or 222 miles of street frontage, are figured in the assessment. The assessment as prepared by the Department of Engineering, filled 700 legal cap typewritten pages, which listed 13,448 names of property owners. Of late years it has been the custom to substitute oil for water on all macadam streets, and especially where sand is added. The mat which is formed protects the road and many times does away with the necessity of redressing it. This cost might better be charged up to maintenance instead of being assessed against the individual property owners.

Aeroplane Map Used by City Planners in Dallas

By Major Edward A. Wood

IN order that the city planner may make his studies, many kinds of maps and drawings are necessary to show the relation of one section of the city to another. Natural as well as artificial features must be shown—watercourses, hills, valleys, wooded areas, railroad lines, streets and highways, buildings, etc. Usually these features are delineated by means of a topographical map, requiring months and even years to make. A photograph, however, shows much more clearly than any map both natural and artificial features, and it is here that the map made by aerial photography surpasses any map drawn by hand, because it shows the landscape with its innumerable details and enables the city planner to visualize the scene.

In the zoning of a city, the "mosaic" or aeroplane map is particularly valuable, because it shows so clearly the existing use of the land, the height of buildings, shadows cast by the very high buildings, the relation of the streets and highways one to another, the absence of direct connecting streets, the railway lines, terminals, industrial districts, etc. Taking it all in all, probably there is no one single map of as much value to the city planner as the "mosaic."

Making the "Mosaic"

Dallas is particularly fortunate in possessing such a map. In March, 1920, when city planning began to assume definite form in this city, Mayor Frank W. Wozencraft and Fire and Police Commissioner L. E. McGee asked Colonel Burwell, Commandant of Love Field, if a map of Dallas might not be made by aviators for the use of the City Planning Commission. The matter was finally arranged, and a De Haviland bomber, piloted by Lieut. M. J. Plumb, winner of the New York to Toronto race, arrived in Dallas early in April. Lieut. C. H. Billet, Photographic Officer, U. S. Air

AEROPLANE VIEW OF DALLAS, TEX.

Service, after experimenting with the density of the light, etc., selected an altitude of 6,000 feet and began the making of the big map; 378 plates in all were exposed, and the taking of the pictures was limited to the hours between 10 A. M. and 2 P. M., to avoid shadows. Prominent streets were selected as guiding lines, and the giant bombing plane, adapted to a more peaceful occupation than bombing, flew back and forth along these parallels, accurately recording every detail of the landscape.

One of the greatest advantages of aerial photography is the rapidity with which the work may be done, provided bad weather does not interfere. And yet the task is a difficult one for the pilot, for the ship must keep an even pull and a direct course. Furthermore, the same altitude must be maintained, else the pictures will not have the same proportions.

After the prints have been made comes the tedious part of the task, for every print must be carefully trimmed to fit its neighbor and pasted so as to maintain a proper scale. In this manner the "mosaic" is made, the name being derived from the many pictures that go to make up the completed map.

The Dallas map is about 5 feet by 8 and includes 52 square miles of territory. This covers areas that are not as yet included within the city limits, but which some day will be occupied by the city. The map will be valuable in projecting new additions.

Primarily the map was made for the City Planning Commission, to be used in its work. It will first be used in connection with the zoning of the city, and later in planning major and minor street systems, street widening and street extension projects, relocation of freight terminals, the flood control of the Trinity River, location of parks and boulevards, and many other city improvements. Already the Fire Commissioner has used this map to locate several new fire stations, and, according to George E. Kessler, City Plan Consultant for Dallas, the uses of such a map are legion.

Atlanta Children at Play

"THE OLD WOMAN WHO LIVED IN A SHOE"
With an area of only 26 square miles, Atlanta, Ga., has 18 public parks and playgrounds

Housing Conditions in American City Schools

A REPORT on the finding of a national survey on housing conditions in American city schools has just been published. This survey is the second in the series of studies of conditions in urban schools which is being conducted by the National Committee for Chamber of Commerce Coöperation with the Public Schools, and the American City Bureau.

Four hundred and twenty-nine cities have participated in this survey. The purpose of this wide coöperation between civic and commercial organizations with city school officials is to assist in the study and development of the local school program based upon carefully assembled facts. When the American people come to a full realization of the present emergency they can be counted upon to provide the support necessary for the maintenance and development of our public school system.

Public school enrollment, size of classes, school buildings and grounds, and local taxation in support of schools vitally affect the efficiency of our public schools. The results of this inquiry upon all of these matters will be found in this report. The findings presented here show that we have failed to provide education for all of the youth of America, and that there are tens of thousands of children now housed in old, unsanitary, dangerous buildings. The following is a summary of this survey.

Summary of Report

Attendance

1. The report is based on facts given by 429 cities out of about 950 cities in the United States whose population exceeds 8,000. The population of the cities reporting is 70 per cent of the total population of this group.

2. A growth of 21 per cent in the school population of these cities in six years has greatly increased the demands upon school plants; 19 per cent of all these children leave school before they are 14, and 64 per cent before they are 16 years of age. If this growth in school population continues, or this heavy elimination can be checked in any considerable degree, the congestion in the school plants will become so acute as practically to block the carrying out of the educational program.

Size of Classes

3. Lack of building accommodation is mainly responsible for large classes: 40 per cent of all elementary school classes have 40 or more pupils each; 20 per cent of all kindergarten classes have more than 50 pupils; 11 per cent of all junior and senior high school classes exceed 35 pupils each. In such large classes the individual pupil cannot be given the care and personal instruction to which he is entitled.

Playgrounds

4. Very little playground space is provided for city school children. Half the children reported have less than a 6 by 6 foot plot each for their recreational and athletic activities. Only 19 per cent of them have as much as the standard minimum of 100 square feet. The most favored child of the lowest fourth has only 12 square feet, less than is allotted to him in the classroom.

Buildings

5. Half the children reported are housed in buildings, with their additions, erected more than 22 years ago. One building of every four now in use was built before 1886. Most of the buildings housing half of these children are unsanitary, inadequately lighted, badly heated and ventilated, and do not have rooms that can be converted properly into the shops, laboratories and gymnasiums which are essential to the kind of education now demanded in progressive cities.

6. A large number of the school systems have too many small buildings either for economy of administration or effective grouping of the pupils. Half the elementary school buildings do not exceed ten rooms each, and one-fourth of them have six rooms or fewer.

7. Very few school buildings are fireproof: 44 per cent of all buildings reported have brick or masonry walls, but the material of all floors, ceilings, partitions and stairways is combustible; 21 per cent are

wooden frame buildings. At least 30 per cent of the children in these cities are housed in buildings of more than one story of these two types just described. Only 5 per cent of the total number of buildings are of the types of construction usually called fire-proof.

8. Although this large percentage of school buildings are non-fire-proof, only a small number have fireproofing elements to lessen the fire hazard to the children. In only 18 per cent of the two poorest types of buildings is the heating apparatus in a fire-proof enclosure. At least 25 per cent of the buildings of these two types are of two or more stories and do not have a fire-escape. Thirty-nine per cent of these two types are without fire-extinguishers, and less than 10 per cent of them have automatic sprinkler equipment in any part of the buildings. Only 11 per cent have automatic fire alarms. Such facts as these demonstrate the existence of a real menace to the children of these cities.

9. Thousands of children in these cities are housed in makeshift buildings unsuited to school use, or are on half-time because of lack of space: 130,000 children are using portables; there are 43,000 in rented dwellings, stores and lofts; 55,000 are in annexes; 8,000 are in halls and corridors, and 3,000 in attics; 31,000 are in basements which are inadequately lighted and more than 3 feet below the ground level; 248,000 children in these cities are on half-time. Seventy-five per cent of the cities report one or more of these types of congestion. Over 600 new 30-room buildings are required to correct this one phase of congestion in the schools of these cities.

Expenditure and Tax Rates

10. These cities vary widely in their tax rate for school purposes and in their annual expenditure per pupil attending school. The median tax rate allowed for school purposes is $15 per thousand of the assessed valuation. Half of these cities allow a rate between $9 and $25 per thousand. . The range for all cities reporting is from $1.60 to $60. The amount of income from local taxation for each pupil attending any kind of school in the city last year ranges from $16.50 to $132. The median for all cities reporting is $56.89. The middle half of these cities expend between $45 and $71 per pupil.

Editorial Note.—Copies of the report can be obtained from the publishers, the American City Bureau, Tribune Building, New York, N. Y.

The Unifying Influence of Community Music

WITH A POPUPLATION OF 2,000, LINDSBORG, KANS., PRIDES ITSELF ON A COMMUNITY CHORUS OF MORE THAN 500. SINCE 1882 THE RENDITION OF HANDEL'S "MESSIAH" HAS BEEN A YEARLY FEATURE IN THE TOWN. THE ANNUAL EASTER FESTIVAL IS ONE OF THE MOST IMPORTANT MUSICAL EVENTS IN THE MIDDLE WEST. SINGLE FAMILIES ARE REPRESENTED BY THREE GENERATIONS IN THE CHORUS

Forward Steps
Reported to THE AMERICAN CITY by Municipal Officials & Department Heads

City Managers

Municipal Water Plant Helps Pay City Manager's Salary

WESTERVILLE, O.—This city adopted the city manager form of government by a charter which became effective in January, 1916, and the present manager has held office since September, 1917. Under this plan of city administration a very satisfactory record has been made by the municipally owned water-works and the light and power plant.

During the past year the first big step toward carrying out the new water-works program was completed, namely, the construction of a 20-foot-diameter reinforced concrete well, 31 feet in depth, laying about one mile of 6-inch cast iron force main, and erecting a 200,000-gallon steel water-tank and tower. This tower, shown in the accompanying photograph, was furnished and erected by the Pittsburgh-Des Moines Steel Company.

The policy of the present administration has been to make as many improvements to the utilities as possible from the earnings. When the city manager administration took office in 1916 it inherited several thousand dollars of indebtedness in the water and light departments. The close of the year 1920 shows that the earnings of these plants have paid for approximately $35,000 worth of improvements, enlargements and repairs, and that meanwhile the operation of the utilities has been kept strictly within their incomes.

Although the population of Westerville (3,000) has increased by only several hundred during the last five years, the excellent service of the municipally owned utilities has more than doubled the number of light and power consumers, which has necessitated considerable outlay to provide for the growth. This has been met from the department's income. It is believed that the light and power is cheaper to the consumer than that of the average municipally or privately owned utility.

The writer is heartily in favor of municipally owned water, light, gas, sewage and other utilities, provided they are properly managed. Even small municipalities should be able to employ an expert manager and pay at least three-fourths of his salary and all the salaries of his assistants from the earnings of its utilities, besides having the benefits of this executive's time and experience for the other departments of the corporation. The water and light department of Westerville pays $2,025 toward the city manager's salary.

THE CONICAL BOTTOM AIDS MATERIALLY IN SETTLING SEDIMENT TO BOTTOM OF RISER PIPE OR MUD DRUM

Without a paying water and light plant, Westerville could not employ a city manager and keep within a reasonable tax rate.

R. W. OREBAUGH,
City Manager.

Departments of Education

Teaching Accident Prevention

DETROIT, MICH.—Two years ago the Board of Education of Detroit, upon recommendation of the Superintendent, made safety education one of the subjects of the school curriculum. The first year was spent in an attempt to develop this subject through a part-time supervisor and a committee of teachers. At the end of the first year the social importance of the subject was more fully realized and a full-time supervisor was appointed. The alarming and increasing number of accidents to school children on the streets of the city served to emphasize the need of work along this line.

To the Department of Safety Education was assigned the business of studying the causes of accidents to children in the streets, playgrounds and homes, of building up a course of study to teach accident prevention in every grade, of organizing all the safety work in the public schools, and of cooperating in every possible way with the Police Department, the Fire Department, and with other civic activities concerned with public safety and welfare. Without text-books or precedents to follow, the Department of Safety Education made a careful study and analysis of the accident reports furnished to the Board of Education by the Detroit Police Department. These reports not only revealed the seriousness of a situation that in twelve months caused the injury or death of 1,097 school children in the city, but furnished valuable, definite information about the causes and types of such accidents. They showed, for example, that the younger children need careful instruction and frequent practice in safe ways of crossing the street; that foreign children are in many cases the accident victims; that accidents to boys from twelve to fourteen years of age are usually the result of bicycle riding or hitching; that instruction in home safety is greatly needed to reduce the number of preventable accidents and deaths caused by falls, scalding, firearms, etc.

Experiments were carried on in various grades and schools in order to find out how to teach safety in a manner suited to the natural interest and ability of the children and helpful to the teachers. Every teacher was found to be attempting to teach accident prevention in some way or other, and many of the teachers have contributed useful ideas. As a result of these experiments a course of study has been prepared and is now a part of the curriculum of the public schools from the kindergarten through the eighth grade. It covers the principles of accident prevention, fire prevention, health conservation, first aid, and community civics, adapted to each grade. Safety is not taught as a separate subject and does not impose an additional burden upon the teacher, but safety topics are suggested for use in the regular subjects of the classroom, and are welcomed by the teachers, since they provide motivation and appeal to the interest of the children in their various studies—language, drawing, civics, arithmetic, and especially dramatics. These topics avoid all morbid features of accidents and emphasize the constructive side of safety.

In the lower grades, games are used to teach the children the right way to cross the street and give them a working knowledge of the rules of the road. Starting with the traffic policeman and the pedestrian, both represented by children, the game is gradually elaborated to include automobiles, trucks, street cars and motor-cycles. The front part of the school represents the main avenue nearest to the schools, aisles the side streets, and chalk marks on the floor represent the curbs, street car tracks, and safety zones. Some children in their seats are "tall buildings with the traffic going on around them." Semaphores for the use of the younger children in their traffic games are made by the older boys in the manual training classes. One teacher of a first grade asked her pupils to request their parents to look out for little boys and girls who might be waiting to cross the street, and take them safely across. The next time the children played a traffic game, every one wanted to be a "father taking some little child across the street." Thus very early the idea of service to others is developed, and in many other lessons the same thing occurs, without conscious effort on the part of the teacher to emphasize that objective.

The teaching of accident prevention lends

itself admirably to the various forms of language work, oral and written composition, letter writing, and reading. The saving of life is a subject that children are eager to talk about. They discuss accidents that have come within their experience, describe ways of avoiding such accidents, tell what they are doing to help safety, compare safe places to play in with unsafe places, safe toys with unsafe toys, all with such lively interest that the teacher's only difficulty is to direct the discussions into the most helpful channels, and emphasize the constructive side of safety.

Drawings by kindergarten and first-grade children illustrating safety at the street crossing show that the children have a clear idea of the four corners, the traffic policeman who helps pedestrians across, and people waiting for the signal, and some children even add an automobile or two to their drawing. Although in these crude sketches other persons are represented without arms, the policeman never fails to be provided with these useful appendages, and with blue uniform, buttons and badge as well. In the minds of kindergarten children the idea of a uniform is already established and they may be given a conception of the other uniforms with which they are familiar, that of the postman, fireman, street cleaner, etc. In this way an intelligent and helpful attitude toward public service is developed, and the foundation laid for good citizenship.

The course of study provides for safety clubs and organizations for safety by the pupils themselves, for coöperation with the Fire Department, in efforts to reduce the fire loss, which in Detroit amounts to more than four million dollars annually, and for participation by the children in all civic enterprises.

The records of the Detroit Police Department show the results of a year of accident prevention work by the Department of Safety Education:

	Sept. 1, 1918 to Sept. 1, 1919	Sept. 1, 1919 to Sept. 1, 1920
Fatal accidents to school children	96	48
Serious accidents to school children	164	102
Minor accidents to school children	837	439
Total	1,097	589

HARRIET E. BEARD,
Supervisor, Department of Safety Education.

Public Works Departments

Auxiliary Garbage-Collection Equipment on Ash Wagons

WINNETKA, ILL.—In this city garbage and ashes were formerly collected in separate equipment. It was noted, however, that the amount of garbage collected on any one route during the winter months was considerably less than the amount collected on the same route during the summer months. The absence of alleys in Winnetka made it necessary to work the two equipments together, namely, one ash wagon and one garbage wagon, in order to operate with only two men on each route. It was found that by fitting each ash wagon with the auxiliary carrying equipment shown in the illustration it was possible to do without garbage carts entirely during the winter months, thus saving the hire of five horses per day.

THIS SIMPLE EQUIPMENT MAKES IT POSSIBLE TO DO WITHOUT SPECIAL GARBAGE CARTS IN WINTER

The construction of the equipment is very simple, as it consists only of two metal containers of heavy galvanized sheet iron with reinforced corners and edges, supported by an angle-iron rack hung from the top of the ash wagon and clipped securely to the rear axle. This equipment has worked out very successfully and merely requires the proper bracing of the rear of the wagons used so that they will not be injured by the weight of the garbage and the containers.

W. A. GIBBON,
Superintendent of Public Works.

Public Welfare Departments

Recreational Activities Coördinated

HOUSTON, TEX.—The boards of Community Service and of the Recreation Bureau of the Department of Public Welfare of the city of Houston were recently consolidated. They made a combined appeal to the Mayor and Council that a full department of the city government be created to supersede the previously existing bureau. This request was granted on January 24, and an ordinance establishing the Department of Recreation and Community Service was passed.

The ordinance creates a Board of Commissioners of eleven members, of which the Superintendent of Schools, the Superintendent of Parks, the City Librarian, the City Health Officer, and the Director of Public Welfare are ex-officio members. Thus the recreational activities of the city are coordinated.

The ordinance provides that all children's playgrounds, indoor recreation centers, play fields, gymnasiums, public baths, comfort stations, and other recreational properties now owned and controlled by the city of Houston, or that may hereafter be established or acquired by the city, shall be under the control and management of the new commission. The power of the School Board or the Park Board to veto the use of any of their respective buildings or grounds for recreational purposes is preserved to those boards. The ordinance also gives power to the new commission to conduct recreational activities on or in private properties with the consent of the owners. The new department has power to receive donations, legacies, or bequests for the improvement or maintenance of its playgrounds or recreational properties.

Having secured the creation of the new recreation commission, the former boards of the Recreation Bureau and Community Service then organized themselves into a new voluntary association to be known as the Recreation and Community Service Association of Houston, for the purpose of supplementing municipal appropriations from voluntary contributions, in order that a larger consolidated and well-coördinated program of public recreation may be developed in this city.

H. WIRT STEELE,
Director of Public Welfare.

Recreation Departments

A Recreational Center Which Teaches Self-Government

ROCHESTER, N. Y.—A plan for community work aimed at developing boys into useful citizens is being worked out by a group of Rochester citizens who have enlisted the aid of educational authorities. Business men who are backers of the plan have insisted on remaining anonymous.

An evening recreation center for boys from 12 to 15 years old, in which instruction will be given not only in games and athletics, but also in self-government, has just been opened as an adjunct to the public night schools. This recreation center plan is an experiment in Americanization. The school in which the center is being conducted is in one of the foreign districts of the city. The work of this center is under the immediate supervision of the director of the department of physical education of the public schools. Classes will be held for two hours in the evening once a week.

Boy students at both day and night schools, and working boys, will be admitted to the classes. They are divided into three groups, according to age, and each evening is divided into four periods so that individuals may take part in all four classes each evening.

The first class takes up gymnasium work,

with training in basketball, mass athletic work to fit the boys for later competition, also wrestling and mass games of many sorts which have proved effective in training boys both mentally and physically. The second class is held in the game room and plays chess, checkers, shuffleboard, and pool. The third class is known as the self-government group, and gives training in parliamentary law, the conduct of meetings, and extemporaneous speaking, all of which will aid in turning out good American citizens. The practical application of what is learned to the problems arising out of the organization of the center as a whole, is the aim of this class. The fourth class takes up a special activity each week, such as Boy Scout work, motion pictures, Safety First, thrift, etc.

HERMAN J. NORTON,
Director, Department of Physical Education of the Public Schools.

Fire Departments

A Satisfactory Fire Signal

BRIDGEPORT, CONN.—The city of Bridgeport has installed and uses for fire signals eleven Klaxon horns in different sections of the city. They have been in use for six or eight years, giving excellent service and demonstrating their effectiveness in clearing the streets. They are operated from fire alarm headquarters; those in the center of the city through a uniform time relay, which is cut in at headquarters on a closed tapper circuit and is operated by a 20-volt storage battery through a switchboard. There is a duplicate set of batteries in reserve. In testing, the record is made on the outgoing register, in the same manner as for the alarms going to the engine houses, which furnishes a check on the condition of the circuit.

The open-circuit side has a duplicate set of twelve storage batteries that run to each of the seven horns operated from headquarters to a 4-ohm open-circuit relay, located in the horn box on the pedestal. There are ten weather-proof Columbia dry cells in each horn box to operate the horn. Using a relay and batteries at the location of a horn enables one to make all necessary tests in cleaning and adjusting a horn without disturbing any other horn.

IN CASE OF FIRE, THESE HORNS EFFECTIVELY CLEAR THE STREETS

There is a push button key on the telephone desk at fire headquarters, and when the apparatus responds to a still alarm, a signal of 2-2 is keyed out by the operator without leaving his chair. The accompanying picture shows the pedestal with horn, fire and police box, and signal light, which is flashed by a motor-driven transmitter at police headquarters. There are forty-eight of these lights. The globes have the words "Fire Alarm" or "Police" on them, as the case may be. When not being flashed, a steady light is shown.

This fire alarm device was worked out in the Bridgeport Fire Department, and has proved exceedingly satisfactory.

ARTHUR E. PLATT,
Superintendent, Fire Alarm Telegraph and Police Signal System.

Forward Steps Gathered Here & There

Children as Home Fire Inspectors

COLUMBUS, OHIO.—The American home is a sacred precinct, not open to invasion, and yet it is a prolific source of fire loss and death. The child is the link that binds the school and the home together, the teacher being practically the mother during school hours. Under the Russell Law, fire prevention must be taught in the Ohio schools, and since this is so, why not use the child as the means of getting the vital doctrine into the home?

From this train of reasoning was born the Home Inspection Blank idea. The city of Columbus tried it out in one of her "Clean up, Spade up, and Keep it up" campaigns. The result was at once astounding and satisfactory. This blank took in not only the fire hazards, but also the hazards to life and limb, and the beautification of the home and its surroundings. Perhaps this was going too far, since a few of the parents objected to questions they considered impertinent, and yet a large percentage of the questions were answered. For instance:

It is difficult to have removed from homes the deadly rubber tube connecting service pipes with different types of natural gas stoves and heaters. Especially is this a delicate task in private home bathrooms and bedrooms. The children found these menaces, and inspectors of this department and the fire department removed them. It is true that some were immediately replaced, since neither this department nor the firemen had a right to destroy them, but in the majority of cases the lesson of the danger had been driven home and—*stuck!*

To make a long story short, each school child, no matter of what grade, was given a blank by his teacher and told to fill it out. The teachers coöperated with this department and the Fire Prevention Committee of the Chamber of Commerce having charge of the local clean-up. Over 5,000 hazards were found. Those pertaining to health were referred to the proper city department. Boy and Girl Scouts also did splendid service. Fire chiefs of other cities used the idea, simplifying or adding to it to meet local conditions. The next time the blanks were used there was less parental opposition. A copy of the blank follows:

HOME INSPECTION BLANK FOR SCHOOL CHILDREN

Ordered by the Fire Chief

The teacher is requested to give one of these sheets to each of her pupils to take home. The questions should be answered by the pupil with the help of the parents and returned to the teacher on the following day. The teacher should take up the sheets when properly filled out and turn them over to the fire chief; they are not intended for the insurance companies.

QUESTIONS TO BE ANSWERED:

1. Name..... Town.....
   Street and No.....
2. Is there any rubbish, such as old papers, broken furniture, etc., in the attic?.....
3. Is there any rubbish or scattered kindling in the basement or cellar?.....
4. Is there any inflammable rubbish in the yard?...
5. Are floors under stoves protected by metal or otherwise? .....
6. Are walls, ceilings and partitions protected from overheating of stoves, furnaces and pipes?.....
7. How do you dispose of your ashes?.....
8. Do you keep your matches away from heat and out of the reach of children?.....
9. What is the material of the house and the roof? .....
10. Is the foundation enclosed?.....
11. Are chimneys in good repair?.....
12. When were they last cleaned?.....
13. Do stovepipes pass through attic or closets?.....
14. If there are any unused stovepipe holes, how are they covered?.....
15. Do you ever keep or use gasoline in the house?..
16. Do you use a gasoline or kerosene stove for any purpose? .....
17. How is your house heated?.....
18. Are any gas connections made with rubber tubing? .....
19. Name all the purposes for which kerosene is used in your home.....
    .....
20. Do you use a "dustless" oil mop?.....
    If so, where do you keep it when not in use....
    .....
21. Do you use electric smoothing irons?.....
22. Name any other fire hazard in or about your home .....
23. Have you any fire extinguishers?.....
24. Where is the fire alarm box nearest your home? .....
25. Do you know how to turn in an alarm?.....

In Columbus, the way to the home through the school child had been admirably paved by Lieutenant Glenn A. Beall of the local Fire Department.

In addition to the inspection blanks, it is now proposed to present an attractive badge, engraved "School Fire Chief," to the best posted scholar in the several schools. After a reasonable time these badges will be open to competitive examination.

WILL C. PARSONS,
Division of Fire Prevention and Publicity, Ohio State Fire Marshal's Department.

Organization of the Sewerage and Water Board of New Orleans

Long-Term Appointive Board Proves Effective in the Administration of Water-Supply and Drainage Systems

THE drainage and water-supply problems to be overcome in New Orleans have been difficult and unusual and have presented many opportunities, if not necessities, for unusual treatment. The fact that their treatment has been in the hands of men who have developed with and by their work and who have in mind all of the local experience and difficulties of the past to guide them in the maintenance, operation and extension of the work in the future, has been a most important factor in the success and economy of the results thus obtained. The Sewerage and Water Board of New Orleans, a long-term appointive board in charge of this work, is composed of 13 members, as follows:

1. Seven members, one from each of the seven municipal districts into which the city is divided, who must be a resident and property taxpayer of said district. These members are appointed by the Mayor, with the approval of the City Council, for 14-year terms, so that, except for deaths, resignations or removal from the districts which they represent, a vacancy occurs only once every two years. In case of a vacancy for an unexpired term, said vacancy is filled for the period of the unexpired term, so that the regular term dates are not disarranged. Reappointment is rather the rule in case of expiration of terms.

2. Two members of the Board are ex-officio members because of their membership on the Board of Liquidation of the City Debt, a life board, which elects to fill its own vacancies, namely, the President of the Board of Liquidation and one other member.

3. Three designated members of the City Commission and the Mayor of the city are ex-officio members of the Sewerage and Water Board, and the Mayor is ex-officio President of the Board.

The members of the Board receive no salaries or compensation in any way from the Board, nor do the members of the Board of Liquidation. The Mayor and members of the Commission Council of course receive regular salaries.

The Sewerage and Water Board was organized in 1899. At that time the City Drainage Commission, which was somewhat similarly constituted, had existed since 1897, and in 1903 there was a final merging of the two boards into the Sewerage and Water Board, constituted as above described, and the drainage work was also placed under the jurisdiction of the Sewerage and Water Board.

The result of the above procedure has been that the original employes of the Drainage Commission and the first employes of the Sewerage and Water Board taken on from 1900 to 1903 constituted the nucleus of the force used to develop all three systems. Nearly all the men occupying the most responsible positions in connection with all three systems have come up by promotion from these original forces. No one has ever lost his position or failed of promotion because of any political consideration.

At present the demand for service is overtaking the capacity of the present system, and the funds available for further improvements are too limited, with present material and labor cost, to permit the Board to maintain such margins of safety as should really exist in the services over which it has jurisdiction. This necessitates conditions for both operation and improvement which demand the most intimate knowledge of the systems by the forces in charge, in order to have the greatest possible amount of service for every expenditure and still keep everything moving toward proper and logical ultimate developments.

A Wise Policy

The original general main drainage plans prepared in 1895, and the sewerage and water plans developed from 1900 to 1903 and built mainly from 1903 to 1909, have all three proved themselves admirably adapted to meet the local difficulties, and the gradual construction and extension of all three systems have conformed closely to these general plans, which in no case attempted to dictate so minutely the procedure of the future as to preclude such improvements as experience and changing conditions might require.

There has, therefore, never been anything like a change of policy or administration on

the part of the Sewerage and Water Board, but the whole development from the first inception of the drainage system, the construction of which was started in 1897, has been carried on harmoniously with a gradually expanding force to meet the expanding fields of work—first design, then construction, then maintenance and operation, with extensions and improvements, all with the unanimous belief that every dollar of expenditure was of service for the greatest number of people.

The expenditure for the construction of the three systems out of the Sewerage and Water Board construction fund have aggregated about $30,000,000 to date; the cost of maintaining and operating the three systems was $1,089,000 for 1919, having gradually increased to that amount from $743,000 in 1915 on account of the increased material and labor costs, and increased amounts of service required of all three systems. In all of these expenditures there has never once been even a suspicion of any graft or any impropriety on the part of any member or any employe of the Board.

All of the above would seem to indicate the wisdom of having commissioners appointed for longer terms than that of the city administration. It was the obvious and expressed intention of the law creating the Sewerage and Water Board, that its salaried employes should hold their positions indefinitely, so long as there was need for their services and they were competently performing such service, and that vacancies should be filled as far as possible by promotion. There has as yet been no tendency to follow any other course.

Art Suggestions for American Homes and Communities

Realizing the vital importance of home surroundings as a background for developing American life, The American Federation of Arts, a national organization of 252 chapters and thousands of individual members throughout the country, has in circulation two interior decoration exhibitions giving color and arrangement schemes for home furnishings; several exhibitions of printed and woven fabrics which may be used in the various rooms from the living room to the nursery; several exhibitions of prints, most of them in color, and photographs suitable for home decoration. Other pertinent collections to follow will include pottery, furniture, silver, lighting fixtures, etc. Recently the Federation has inaugurated a service which consists of sending to individuals portfolios of prints and photographs so that home-makers may at their leisure select one or more which particularly appeal.

Not only to the home of moderate means does the Federation confine its suggestions. It keeps continuously on tour many groups of original oil paintings, water colors, etchings, tapestries, pieces of sculpture, most of which may be purchased. Then there are the collections of domestic architecture and landscape architecture, which round out this comprehensive group of some fifty traveling exhibitions.

All the collections sent out by The American Federation of Arts are assembled by experts, and while, of course, they are not submitted arbitrarily by the Federation jury, they contain some of the finest examples of artistic production in the various lines represented. A community showing an exhibition sent out by this organization benefits by it, and nine times out of ten makes the showing of Federation exhibitions a habit. Membership is not a condition of obtaining the exhibitions, and they may not be shown for pecuniary profit.

A most interesting sidelight on this effort of The American Federation of Arts is the interest shown by public-spirited citizens and groups from the standpoint of community or town growth. The presence of such exhibitions in a town or village, or in a club or institution in a larger city, gives a certain *cachet* to the community or region, a sign indicating progress, a proof that that group at least is looking toward cultural advance.

Further information may be obtained from Richard F. Bach, Extension Secretary, The American Federation of Arts, Metropolitan Museum of Art, New York, N. Y.

Playgrounds and More Playgrounds—How to Get Them

By Harrison Gray Otis

EDITORIAL NOTE.—*An increased and widespread interest in outdoor recreation is one of the war's heritages. Cities everywhere are enlarging their playground systems, and are employing more trained recreation leaders. The Playground and Recreation Association of America, 1 Madison Avenue, New York City, has for fourteen years been promoting the play movement, and presents herewith a resumé of the methods that cities are employing to secure and extend public playgrounds and recreation systems. Getting playgrounds is only one step in the program. There still remain the problems of construction, equipment, management, operation, activities, and methods of securing trained play leadership.* THE AMERICAN CITY *will welcome inquiries from readers on any matters having to do with community recreation.*

MR. and Mrs. Public have about decided that playgrounds are good things. We say "about," because there are still hundreds of towns and cities that seem quite sure their alleys and gutters will do for Johnnie, and that Nellie should "stay in her own back yard," anyway. However, the rapid spread of the playground movement during the past few years gives hope that Progress is winding up the Big Bens of public opinion and placing them under the pillows of these slumberers. An early awakening seems certain.

Courtesy Park International

WE WANT A PLAYGROUND

There is a difference between deciding that a thing is good, and investing in it. Enter, the familiar problem of ways and means. How can we get playgrounds, more playgrounds? is the question before the house.

The fact that other cities whose financial conditions are probably no more flourishing than our own are investing thousands, even millions, in playgrounds and parks, shows that the problem can be solved. The methods by which some of these towns have secured the necessary funds may point out the factors which will solve the equation in our town.

The year's statistics for 1920 showing the progress of public recreation in American cities present some interesting figures.

The 465 cities reporting, maintained 4,293 playgrounds and recreation centers under paid leadership. They employed 10,218 workers—an increase of 2,175 over the number reported for 1919. There was an increase of 42 per cent in the number of playgrounds and recreation centers established during the year. More than $7,200,000 was spent for recreation work.

The complete report on bonds issued is

not yet on hand, but during 1919, 17 cities voted a total of $13,510,000 for establishing and increasing playground systems. One of the largest bond issues recorded in 1920 is that voted last November by Akron, Ohio, a city of 208,000 population, amounting to $2,000,000 for a system of parks and playgrounds. The largest single investment in recreation authorized during 1919 was the $10,000,000 bond issue voted by Detroit for increasing its public outdoor play facilities.

These figures are little less than astounding when we realize that the whole movement for organized playgrounds in America is a development of this generation. When Chicago appropriated its first $1,200 for playgrounds, there was widespread opposition and ridicule aroused by such a "frivolous expenditure of public money." This was less than twenty years ago. To-day Chicago has millions invested in its wonderful playground system. Is it paying? A study of juvenile delinquency, by Allen T. Burns, shows that the presence of recreation centers in Chicago's south side was coincident with a decrease of delinquency within a radius of half a mile, amounting to practically 30 per cent. Chicago's voters prefer to invest in playgrounds rather than in reformatories and jails.

A clear presentation of such facts means more playgrounds. There are arguments a-plenty to appeal to the heart and the pocketbook of the shrewdest business man. The art of driving them home is salesmanship, and when the idea is thoroughly sold by modern publicity methods, the chief problem is solved, for if a community really wants playgrounds it can always find some way to raise the funds.

Public Pay for Public Play

There is a growing tendency to regard recreation as a municipal function, and there are, of course, self-apparent reasons why the public should support these recreation centers which benefit the citizenship as a whole and are open equally to all. Figures are not available as to just what proportion of funds for securing playgrounds comes from the public treasury, and what part is subscribed by private individuals.

It is, however, significant that in 361 of the 465 cities reporting, public recreation work was supported in whole or in part by some department of the municipality—over 79 per cent of the total number, and an increase of 20 per cent over the corresponding figures for 1919.

Whenever the field secretaries of the Playground and Recreation Association of America are called upon to assist a community in developing a year-round recreation system, which usually involves more playgrounds, the advisability of securing municipal appropriations is strongly urged. The method of procedure employed by these trained promoters of community recreation varies, of course, with local conditions. The request for their services usually comes from some responsible organization, such as the Chamber of Commerce or Rotary Club, from a group of leading citizens, or from the city government itself. A strong representative committee is formed, and a careful study of the local problems made. A year's program is then developed, including the construction of a playground system or the expansion of the playground system in many cases, and a detailed budget is prepared. Simultaneously, an educational campaign is carried on, utilizing the usual channels of interviews, speeches, newspapers, and sometimes demonstration playgrounds, parades and pageants.

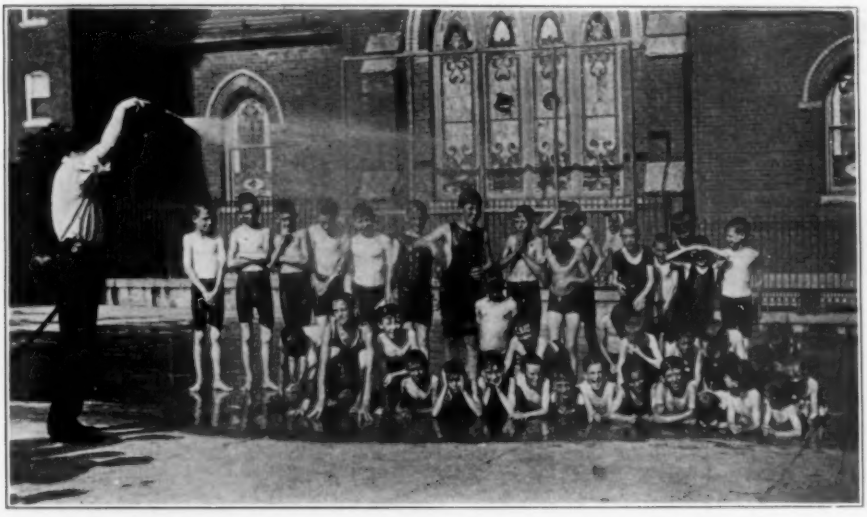
The budget and a draft of the necessary legislation, with supporting data, endorsements, petitions and information as to what other cities are doing, is duly laid before the city authorities at the right time, by the right people, in the right way. Usually the initial municipal appropriation is not so large as will be needed as the work develops.

Frequently the community finds that its immediate playground needs exceed the limitations of the available city funds and require a special bond issue, which usually means an election. Again, it develops that the legal taxing and bonding limits have already been reached and do not permit of further expansion. Increased taxation, moreover, is sometimes a bugaboo difficult to overcome, for it is a strange fact that some men who are generous contributors to a worth-while movement will oppose the same movement if it means a higher tax rate. Consequently, many cities have decided, perhaps wisely, not to wait for sufficient public funds before starting their playground systems.

"Coupon Bonds" for Playground

Charlotte, N. C., has a population of some 50,000. Playgrounds were needed. A group of citizens decided to endeavor to raise money by popular subscription, and placed the necessary amount at $15,000. Feeling the need of the added stimulus to be gained by calling in a trained community organizer, arrangements were duly made, and a general committee of those interested met with the Mayor on Saturday, May 15, 1920. At this conference so much opposition was aroused that the Mayor was requested to telegraph the organizer not to come, but fortunately could not locate his address. On Monday a second conference of the same group was called, with the organizer present. It developed that the city was just passing through a tremendous financial campaign to secure $40,000 for another movement, and that the total amount raised was only $22,000. The community and its leaders were worn out and discouraged. The organizer, realizing that it would be impossible to conduct another drive of a similar nature, sketched a rough draft of a certificate calling for the underwriting of $100. Attached to this certificate were nineteen $5 membership coupons. A person subscribing to a $100 certificate would automatically become a member of the general advisory board of the Charlotte Playground Association. He was, of course, privileged to sell as many of the $5 membership coupons as he wished. It was explained to the committee that if they issued 150 of the $100 certificates and sold them they would have their $15,000 and, incidentally, an advisory board composed of those who were actually interested in the movement. In turn, if these 150 holders each sold all of his $5 memberships, there would be a total sustaining membership in the Playground Association of 3,000.

The committee decided it was worth trying, and arranged for speaking dates and luncheon engagements with the following organizations: the Rotary Club, the Kiwanis Club, the Good Fellows Club, the Parent-Teachers Association, the Woman's Club, the Teachers Association, the United Daughters of the Confederacy, the Daughters of the American Revolution, and a number of others. Before each group the playground movement was advocated, and it was carefully explained that the financial methods proposed would not involve soliciting money by the usual drive methods. A general luncheon to be held at a leading hotel Wednesday noon, May 26, was announced, and cards pledging the signers to attend this luncheon were distributed at these meetings. Two committees were appointed; one called the "Initial Gifts Committee," composed of leading business men, was detailed to do a bit of advance work so



ENJOYING A HOSE BATH AT A PATERSON, N. J., PLAYGROUND

THE PLAY OF CHILDREN HAS THE MIGHTIEST INFLUENCE ON THE MAINTENANCE OR NON-MAINTENANCE OF LAWS. PLATO.
PLAYGROUND STOCK
SHARES $1.00 SERIES 1910.
No. SHARES
NON-ASSESSABLE - UNLIMITED ISSUE
PLAYGROUND ASSOCIATION
BALTIMORE'S
This Certifies that
residing at has subscribed
to the number of shares of PLAYGROUND STOCK indicated above, thus contributing to the health and happiness of the children of to-day and promoting the present and future welfare of the community
In Witness Whereof the duly authorized officers have affixed their signatures this 27th day of April 1910
CHAIRMAN
TREASURER
THE UNIVERSAL IMPULSE TO PLAY IS A DIVINELY WISE IDEA. IT GOD GIVES THE DISTRICT MAN OUGHT TO PROVIDE THE PLAYGROUND.
JOSIAH STRONG
THE CHILD WITHOUT A PLAYGROUND IS A FATHER TO THE MAN WITHOUT A JOB.
JOSEPH E. LEE
ON THE NATURE OF CITIES DEPENDS THE GREATEST POSSIBLE GOOD OR EVIL TO THE HUMAN RACE. ARISTOTLE

PLAYGROUND "STOCK CERTIFICATE" ISSUED IN BALTIMORE, MD.

as to start the subscriptions off in good shape. The "Follow-Up Committee" was appointed to take the names of those who had agreed to attend the luncheon, to see that they did not forget the appointment, and to secure the attendance of other representative citizens.

At the luncheon 145 people were present. The "eats" were followed by some rousing community singing, and the campaign plan was sprung. Within an hour the entire issue had been sold and over-subscribed, and there was every indication that the $16,100 pledged would be increased to $20,000 with little effort.

A similar method was employed in Wilmington, Del., in September, 1920. An executive committee of the City Park Commission and of the Wilmington Community Service had charge of the campaign. September 26 was "Community Sunday," and the pastors referred in their sermons to playground and recreational work. Officials of the Central Labor Union offered campaign help, and General T. Coleman DuPont added impetus to the drive by offering to give 5 per cent of the entire sum raised during the campaign. The "surprise feature" of the campaign was made known at the campaign luncheon at the Hotel DuPont on September 28, when the sale of $100 "coupon bonds" began. "Buy a playground bond" became the slogan. The young women of the Red Cross Motor Corps went about the room collecting pledges. An aggregate of $22,600 was subscribed.

The following organizations bought bonds at the luncheon, to the stated amounts; the inmates at the New Castle County Workhouse (where community sings had been held), $100; Volunteers of America, $500; Knights of Columbus, $700; Washington Heights Century Club, $200; Junior League, $300; Greek citizens, $1,000; Stores Committee, $300; DuPont employes, $1,200; Theater Committee, $100; St. Andrew's and Grace Churches, $100 each; Daughters of Isabella, $300; Central Labor Union, $1,000; Kiwanis Club, $500; Red Cross Motor Corps, $1,500; Hercules Powder Company, $400; Speakman Company, $200. Large contributions were also made by private citizens.

Somewhat kindred to the "coupon bond" method is the "stock selling" plan. Baltimore was perhaps one of the first to sell playground "stock," in its playground campaign of 1910. One-dollar shares were sold at par in whatever quantities the purchaser could be persuaded to invest. This method lacks the "hurry-up" feature of the $100 coupon bond, but by reducing the unit from $5 to $1 the number of "investors" is increased. The stock certificate, attractively engraved and containing apt quotations, has proved a popular selling document.

Community Chest at Cleveland

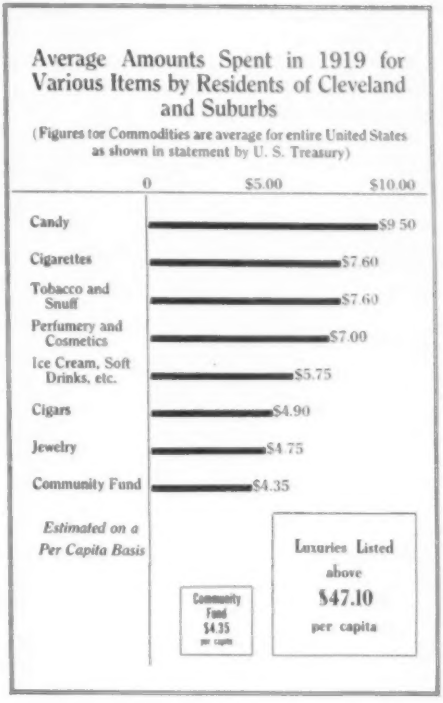
There is hardly a community in the country that has not had experience in conducting popular drives during the past few years, though perhaps "popular" is no longer a good word to use in this connection. There are cities, however, that are raising their funds for playgrounds by the same sort of campaign methods employed during the war. Other cities have adopted the "community chest" idea, with their playground projects included in the general budget. Cleveland, Ohio, has had a particularly successful experience in conducting community chest campaigns. The budget

for 1921, which has recently been raised, provides $41,960 for Cleveland's recreation council. Some of the publicity methods used by Cleveland may well be adapted to playground campaigns. The accompanying diagram, which appeared on the back cover of the campaign book, tells its own story.

During this campaign an eight-page photogravure newspaper supplement told the story in pictures in a most forceful and impressive manner.

At Winnetka, Ill., a residential suburb of Chicago, effective use was made of letters sent to practically every citizen. The letterhead contained the names of the "Committee of One Hundred" and set forth the proposition briefly, clearly, and with a telling touch of human interest. Attached to the letter was a table of parallel arguments issued by the Playground and Recreation Association of America.

Oftentimes the playground movement has had for its sponsor some one or more community organizations. At Hagerstown, Md., the Rotary Club was so thoroughly "sold" that it became godfather to the movement and pledged sufficient funds to start things going. In Newark, Ohio, the public schools organized and put through a successful campaign. Six hundred high school students were divided into thirty teams of twenty pupils each who did the actual soliciting.



PLAYGROUND CAMPAIGN PUBLICITY IN CLEVELAND

A Neighborhood-Made Playground

A great deal can be accomplished without much money if there is determination and coöperation. In the stock-yard district of San Francisco, known as Bay View, the community got together last spring and turned a stump-filled, tin-can-covered field

PLAYGROUNDS DEVELOP:	PLAYGROUNDS DIMINISH:
1. *Health*, by spontaneous outdoor exercise	1. *Idleness*, by keeping the child constantly employed
2. *Initiative*, by forcing the child to make his own decisions	2. *Delinquency*, by influences that tend to develop the better self
3. *Purity of mind*, by keeping the child active in wholesome surroundings	3. *Exclusiveness*, by giving each some part in the games
4. *Coöperation*, by teaching the child to give and take assistance, thus showing him the value of concerted action	4. *Unfairness*, by teaching true sportsmanship
5. *Ambition*, by teaching the child that leadership is the result of successful endeavor	5. *Gang-spirit*, by diverting the spirit of leadership into the right direction
6. *Honesty*, by causing the child to repudiate any success that does not come through fair play	6. *Selfishness*, by encouraging the child to help others
7. *Imagination*, by lifting the child out of the commonplace and filling him with enthusiasm	7. *Rowdyism*, by furnishing the influences that foster courtesy and self-respect
8. *Self-confidence*, by giving the child some responsibility in the games	8. *Temptation*, by keeping children off the streets
9. *Obedience*, by teaching the child to respect the leader	9. *Social barriers*, by bringing children of all classes together
10. *Justice*, by teaching the child to have consideration for those who are physically and mentally weaker	10. *Reformatories*, by giving the child active work to do, thus forming instead of reforming character

PARALLEL COMPARISON USED AT WINNETKA, ILL., AND ELSEWHERE

into a community playground. Five hundred men, women and children spent a single day on the job, and the result was a surprise to everyone. A baseball diamond was laid out, a basketball court staked off, and a kiddies' corner located. The equipment was furnished by local fraternal organizations: the Ancient Order of Hibernians gave the backstop for the ball field; the Knights of Pythias equipped the basketball court; the Carnation Club supplied the kiddies' field with sand-boxes, swings and slides. The entire play field, complete in every detail, was constructed and equipped by volunteer effort.

A time-honored way of raising money was employed at Key West, Fla., with rather unusual success. On April 6, 1920, the Red Cross held a cabaret and dinner dance for the purpose of securing funds for the playground. The affair consisted of a fashion review, instrumental and vocal music, and esthetic and social dancing. About 400 people attended, and the gross receipts totaled $1,000. The amount cleared was enough to begin the playground work contemplated. On April 8 and 9 a one-act play, entitled "America First," was given at two of the public schools. The admission charge of 15 and 25 cents yielded $250 for playground equipment. This method of securing funds has the advantage of being a worth-while sort of community recreation in itself. There were 88 people in the cast, and music was furnished by two volunteer community orchestras.

Individual Donations and Memorials

Many communities have started or increased their playground systems through the generosity of well-to-do citizens who have donated funds, land, and in some instances fully equipped playgrounds, to the city.

There are many illustrations of this form of public service. Two of the best-known in the country are those at La Jolla, a neighborhood of San Diego, Calif., and Peoria, Ill., where complete recreation centers, including admirable community buildings, have been constructed through the generosity of private citizens.

By far the larger number of playgrounds have been secured through bond issues and municipal appropriations, yet in nearly every case the initiative has fallen upon community leaders who have created the public sentiment necessary before public funds are forthcoming. Coöperation and publicity are the fundamental requisites. A handbook on publicity methods has just been published by the Playground and Recreation Association of America.

Many playground systems owe their existence to a combination of public and private funds. In Americus, Ga., last May, the city bought a playground site for $11,000, and the Americus Community Service committee undertook to raise a like amount for equipment and operation. At Bay City, Mich., playground funds are provided in part by the school board and in part by the Bay County Community Board.

Intelligent Leadership Essential

The one thing needed most in this, as in all civic projects, is enlightened community leadership. The modern chamber of commerce democratically organized is admirably adapted to the task of starting the ball rolling.

Before a community sets out to get playgrounds it must know what it wants. A definite proposition is much easier to sell than a vague principle. Some sort of intelligent study of the local situation, tempered by the knowledge of what other cities are doing, and of the essential features of modern playgrounds, is a prerequisite. It is often a wise economy to invite the cooperation of some acknowledged playground authority before definite plans are adopted.

Another prerequisite is a clear understanding of the laws relating to playgrounds. Several states have already passed enabling acts providing for their construction and maintenance. Among the best of these acts are the ones passed in Michigan, in New York and in Pennsylvania.

State after state is enacting laws making compulsory the proper physical education of school children. A well-equipped playground is almost essential to the carrying out of such legislation. The time is not far distant when every city and town of the country will come to realize the importance of organized play in the great out-of-doors as a mighty factor in building good citizenship.

Standard Schedule for Grading Cities and Towns for Fire Insurance

Part III

With Reference to Their Fire Defences and Physical Conditions

By John S. Caldwell

Engineer, New England Insurance Exchange, Boston, Mass.

EDITORIAL NOTE.—*The earlier instalments of this article cover the requirements for a satisfactory water-supply and fire department and the deficiencies applied to the Standard Schedule for insufficient equipment or personnel.*

THE response to alarms should include that an adequate running card will be established, providing for first and subsequent alarms, and for outlying companies to occupy vacated stations. Apparatus should respond to all first (including telephone) alarms in amount commensurate with the normal hazard of the district, but not less than as follows:

In mercantile and manufacturing districts:

Not less than 2 engine or hose companies and 1 ladder company in cities under 25,000 and over 4,000 population

Not less than 3 engine or hose companies and 1 ladder company in cities over 25,000 and under 50,000

Not less than 4 engine or hose companies and 2 ladder companies in cities over 50,000

In residential districts:

Not less than 2 engine or hose companies, except for cities under 4,000 population

Modern fire methods should include the liberal use of chemicals, shut-off nozzles, and salvage appliances to reduce water damage, the use of appliances for powerful streams on serious fires, suitable ladder work and ventilation, and the general policy of attaching lines to siamese connections serving sprinklers and stand-pipes.

Lack of proper equipment should be considered in determining deficiency in fire methods.

In considering conditions affecting fire department operations, the street surfacing, existence of railroad crossings, drawbridges, grades, traffic regulations and ordinances are considered, together with presence of high-tension and overhead wires, which introduces a more or less obstruction to the use of ladders and in general retards the work of the department.

Systematic and frequent inspections of buildings should be made by company and department officers to acquaint them with local conditions, and records of such inspections should be kept both by notes and sketches.

Proper records of all fires, fire methods, losses, apparatus, and all department matters should be kept in convenient form.

Fire Alarm

The subjects considered under the fire alarm system are as follows:

1. Qualifications of Management
2. Adequacy of Maintenance Force
3. Operators
4. Headquarters Building
5. Apparatus at Headquarters
6. Circuit Protection
7. Batteries
8. Circuits Underground
9. Condition and Material of Circuits
10. Circuits near High Potential
11. Open or Grounded Circuits
12. Overloaded Circuits
13. Alarms to Fire Stations
14. Condition of Inside Wiring
15. Type of Boxes
16. Conspicuousness and Accessibility of Boxes
17. Condition of Boxes
18. Distribution of Boxes
19. Tests and Records
20. Speed of Alarms
21. Fire Department Telephone System
22. Transmission of Telephone Alarms
23. Provisions for Transmitting Telephone Alarms from the Telephone Exchange
24. Method of Handling Telephone Alarms at the Telephone Exchange

In considering the item of Qualification of Management, it is assumed that the executive in charge is competent and experienced in the details of fire alarm construction and maintenance to efficiently fill the office.

The maintenance force should be adequate so as to minimize the time that the system would be out of commission in case of breakdown, as well as to efficiently operate and maintain it, or good, reliable provisions should be made for obtaining emergency competent help.

The operating force should consist of some competent man controlled by the municipality, but not necessarily at fire alarm headquarters, on duty at all times to handle telephone alarms, provided, however, that in municipalities of less than 10,000 population one-half credit, and in larger cities one-quarter credit, may be given for a telephone operator on duty at each public exchange at all times with facilities for transmitting alarms giving the definite location of the fire.

In cities handling an average of over one alarm a day, a fire alarm operator should be on duty at fire alarm headquarters, and when manual operation is depended upon for transmission of alarms, two operators should be on duty at all times. An operator of the department telephone system if capable of operating the fire alarm system may be considered as one fire alarm operator.

The building housing the apparatus on which operation of the system and the receipt and transmission of alarms are dependent should be housed securely against fire, including danger from conflagration. When service is dependent entirely upon the telephone exchange, application shall be made to the exchange building.

The apparatus at headquarters should be such as will ensure the receipt, recording and transmission of all alarms, and should be maintained in proper working condition. Cities having over 100,000 population or more than 350 alarms a year should have provision permitting transmission manually; if automatic transmission is also provided, means should be provided for cutting out the automatic feature. Relative values of headquarters equipment are as follows:

	Per Cent
Manual System:	
Receiving apparatus	25
Transmitting apparatus	25
Recording apparatus	20
Switchboard	15
Testing facilities	15
Automatic System:	
Repeater	50
Break-wheel transmitter	20
Switchboard	15
Register	10
Cable terminal	5

In automatic systems registering device and means of manual transmission need not be at fire alarm headquarters, but must be where telephone alarms are received.

The protection to circuits should consist of heavy-current and sneak-current fuses and lightning arresters at headquarters, so located as to prevent injury to any operating mechanism, lightning arresters and heavy-current fuses at junction of overhead and underground construction and heavy-current fuses on battery rack.

Energy for operating the system should be supplied by storage batteries in duplicate sets, or generator sets with sufficient reserve, properly mounted in a well-heated and ventilated room separated from other apparatus. In single-circuit systems primary batteries may be used. Provisions should be made for obtaining a duplicate source of supply within five hours. Charging should be normally from an all-metallic circuit and should preferably be current of not over 250 volts.

The location of outside circuits should be underground. In underground construction and aerial cables, they should be at least No. 14 gauge copper with rubber insulation in lead sheathing and with each leg of a circuit in a different cable. All aerial circuits should have conductivity of No. 10 galvanized iron and tensile strength of No. 10 copper wire, with double or triple braided weatherproof insulation. Pole construction should be substantial, and wires including box leads should be well strung and free from injury. The running of circuits into buildings other than fire stations introduces a hazard.

No circuit should be in the same duct or manhole nor on the same pole with high-potential circuits. All box and alarm circuits must be normally closed, all metallic and under constant test. There should not be more than twenty boxes dependent upon any box circuit, and box circuits should have only boxes attached, except that in automatic systems registering instruments and tappers in fire stations may be connected. No alarm circuit should connect instruments in more than five fire stations.

Except where only a single circuit system is required, each fire station should receive alarms over two alarm circuits; in an automatic system each box circuit should extend to some fire station and may count as one of the alarm circuits. Station apparatus should include a gong, a tapper and a permanent registering device, the register and tapper to be on the box circuit in automatic systems.

Circuits at headquarters and in fire stations should be in accordance with the National Electrical Code, wooden moulding be-

ing strictly prohibited, and all circuits should enter stations in conduit.

Boxes including both public and private should be of the positive non-interfering type, and when more than twenty boxes are on the system they should have the successive feature; all boxes to be accessible to the public and conspicuous as applying to location and designation, and including red lights at night on or close to boxes in high-value districts; they should also be provided with key in lock, glass panel door, or keyless self-acting door.

Boxes should be maintained in good operative condition, tested monthly and after electrical storms, test to include visual inspection, operation, cleaning and repairing; condition of boxes is used in judging of thoroughness of tests.

Proper distribution of boxes requires a public box or a private box accessible to the public within at least 500 feet of every building in mercantile and manufacturing districts, and 800 feet of every important group of buildings elsewhere.

Tests and records should include that circuits at headquarters will be tested three times daily in automatic, and twelve times daily in manual systems, also frequently in wind and electrical storms, including tests for grounds, breaks and current strength; in manual systems insulation resistance to be tested weekly; battery cells to be tested for voltage and electrolyte weekly; office circuits three to twelve times daily, circuits examined monthly and after wind and sleet storms; complete records to be kept of all tests of apparatus and layout of system and of all troubles; condition of system to be used in judging of thoroughness of tests.

Speed of boxes and of alarm transmission should not be less than one stroke per second in automatic and two strokes per second in manual systems; tower bells, if necessary, to be operated on a separate circuit so as not to delay the operation of the system.

There should be a telephone at each fire station connected by a single-party line preferably from some central point where a municipally controlled operator is on duty at all times; for cities having more than five fire stations these should extend from a private switchboard. Provisions should be made permitting stations to be communicated with simultaneously or in groups.

Telephone alarms should be transmitted from the public exchange to the same place in all cases and not to any fire company called, nor to all fire stations simultaneously; they should be transmitted to all fire stations as box alarms, after notifying the nearest company by telephone.

The sounding of ward or box numbers on tower bells or equivalent mechanism is sufficient in towns up to 5,000 population having call or volunteer fire departments.

At least one circuit from the public telephone exchange should be reserved for fire calls with the switchboard jack conspicuously marked, and the supervising operator or other responsible employe should verify the location and oversee the transmission of fire alarms.

Police

The subjects considered under Police are as follows:

1. Cooperation with Fire Department
2. Patrol Wagons
3. Signaling System
4. Cooperation with Building Department

From the standpoint of fire protection, the duties of the police are the discovery of fires and the sending of alarms, the preserving of order at fires, and the reporting of buildings under construction without permit. Adequate service requires a proper signalling and telephone system. Municipalities of over 2,000 population should have an adequate number of patrolmen on duty day and night, and if over 15,000 population, should have sufficient wagons and ropes and a signalling system.

Building Laws

The subjects considered under Building Laws are as follows:

1. Fire Limits
2. Laws
   a. Areas and Heights
   b. Protection to Horizontal and Vertical Openings
   c. Frame Construction in Fire Limits
   d. Wall Thickness
   e. Chimneys and Heating Apparatus
   f. Improved Construction
   g. Private Fire Protection
   h. Provision for Fire Stops, Parapets and Fire Escapes
   i. Provision for Quality of Material and Work
3. Wooden Shingle Roofs
4. Records

It is well recognized among builders and architects, as well as the insurance interests, that one of the large contributing factors to the enormous fire waste in this country is the tinder-box construction of the average American city and town, and while it seems like "locking the barn door after the horse is stolen," the only way to offset

this evil is by the adoption of adequate building laws, either state or municipal. There should be prescribed fire limits, including all closely built mercantile and manufacturing districts and surrounding blocks on all sides which constitute an exposure to the district or within which new construction of a mercantile or manufacturing character is developing; within these limits frame construction should be prohibited. Proper restrictions should be made for heights and areas, requirements for protection to vertical and horizontal openings of all kinds, thickness of walls, private fire protection, chimneys and heating devices, etc., as given in the National Board Building Code. Wooden shingle roofs should be prohibited throughout the limits covered by the water distribution system. A properly qualified official should be in charge, with a requisite number of assistants. Proper records of building permits and operations and inspections to be kept. Lack of enforcement to be considered as equivalent to no laws.

Hazards

The subjects considered under Hazards are as follows:

1. Electricity
   a. Laws
   b. Condition of New Inside Work
   c. Condition of Old Inside Work
2. Gas Lighting and Heating
   a. Laws
   b. Conditions
3. Oil Lighting and Heating
   a. Laws
   b. Conditions
4. Explosives and Inflammables
   a. Inflammable Liquids of Class 1
   b. Inflammable Liquids of Class 2
   c. Inflammable Liquids of Class 3
   d. Hazardous Chemicals
   e. Carbide
   f. Garages
   g. Dry-Cleaning
   h. Nitro Cellulose and Films
   i. Motion Picture Machines and Booths
   j. Explosives
   k. Fireworks
   l. Matches
   m. Combustible Fibres, etc.
   n. Lumber and Packing Material
   o. Rubbish, Trash, Ashes, Bonfires, etc.
   p. Definite Requirement for Inspection of Premises
5. Records

Closely allied with the need of building regulations in our American municipalities is the need of regulation of hazardous conditions in all classes of property, as well as the public highways, and it has been demonstrated that the passage of laws, either state or municipal, on the subject of electricity, explosives and inflammables and proper enforcement of such laws, produces immediate results.

The National Electrical Code is the generally recognized standard for electric wiring; its adoption by ordinance is of first importance. The laws should also provide that current shall not be furnished until the installations have been inspected and approved. These results may be obtained through enforcement by a properly qualified official, or under insurance inspection backed by a city ordinance. Where electricity is not generally used, the hazards of glass-body oil lamps, swinging and open gas flames, and of gasoline and acetylene lighting systems are unusually present. The increasing use of oil for heating and industrial purposes introduces a still further hazard which should be regulated by ordinance. In addition, the laws should cover other uses of inflammable liquids and their compounds, explosives and the care of combustible rubbish of all kinds.

Requirements should conform to the suggested ordinances and regulations issued by the National Board of Fire Underwriters. Enforcement should be strict, and frequent inspections should be made; the most approved method of inspection is through the members of the fire department. Lack of enforcement to be considered as equivalent to no laws.

Structural Conditions

The subjects considered under Structural Conditions are as follows:

1. Area of District
2. Street Widths
3. Accessibility of Block Interior
4. Per Cent of Area in Streets and Open Spaces
5. Per Cent of Block Area Built Upon
6. Heights of Buildings Other Than Fire-proof
7. Large and Excessive Areas Other Than Frame
8. Deficient Party and Fire Walls
9. Unprotected Floor Openings
10. Unprotected Exposed Openings
11. Frame Buildings
12. Permanent Awnings
13. Conflagration Breeding Blocks
14. Exposures of District

This subject is designed to be applied to any mercantile or manufacturing district; in the smaller cities it is to be applied to the principal mercantile district, but in larger cities a separate grading may be desirable for each distinctive high-value district. All items apply only to the district considered.

In bounding a district, streets and alleys, sometimes extended, railroads and natural features will be used where practicable, and every block or part block shall be included in which approximately one-third of the area is of the same general class as the district.

Narrow streets, inaccessibility of buildings, congestion of the district and of the individual blocks, poor general structural conditions and exposures from surrounding sections all increase the probability of sweeping fires.

Buildings of fire-proof construction, sprinklered brick buildings, fire-breaks, fire barriers and separate high-pressure fire systems designed to deliver capacity at 90 pounds hydrant pressure or more, form important mitigating features.

Credits

The subjects considered under Credits are as follows:

1. Superior Construction and Protection
2. Fire Engine Capacity where Water-Supply at Direct Hydrant Streams is Adequate
3. High-Pressure Fire System

(Note.—Items apply only to the high-value district considered.)

Buildings of fire-proof construction and sprinklered buildings tend to offer a barrier against a spreading fire as well as offering the fire department a vantage point in preventing a fire from gaining conflagration proportions, and credits are allowed accordingly.

Where the full fire flow is available as direct streams either from a domestic water system or from a high-pressure system, the maintaining of engines in service, with adequate provisions for their response and operation, is considered an advantage as reducing the probability of a fire gaining headway in the interval of time necessary to control the flow from a broken main, and credit should be allowed accordingly.

A high-pressure system may have a gravity supply, direct pumpage supply, or a combination of the two. It may be a separate system for fire service only or may be the extension of a high-service domestic supply into a low-service area, in which latter case only two-thirds the actual fire flow obtainable should be assumed as available capacity. Fire-boat pipe lines should also be considered. To be standard a high-pressure fire service must comply fully with the various items listed under Water-Supply and be capable of delivering in the weakest part of the system the full fire flow required, including that necessary for a second fire, such supply to be available in an area equal to that served by the number of hydrants necessary to deliver this required fire flow when discharging 1,000 gallons a minute each. For standard fire service this quantity should be available at a residual pressure of 250 pounds, residual pressures less than this, down to 90 pounds as a minimum, permit classing a system as a High-Pressure Fire System, but of less worth in reducing the deficiencies in Structural Conditions. Hydrants should be of ample dimensions with four independently gated hose outlets and with 8-inch gated connections to the mains, to be so distributed that the entire area of the district is protected and the average area served per hydrant will not exceed 40,000 square feet.

Climatic Conditions

The subjects considered under Climatic Conditions are as follows:

1. High Winds
2. Excessive Snowfall
3. Severe Cold Weather
4. Hot, Dry Weather
5. Unusual or Exceptional Conditions

In consideration of these subjects ten years' records have been compiled from the United States Weather Bureau Stations relative to winds of 25 miles velocity or over, snowfall in excess of 10 inches per month, number of days having a maximum temperature of 32 degrees or less, months having an average mean maximum temperature of 65 degrees or more, with the number of days having .01 inch or over of precipitation, and unusual conditions not measured by climatic conditions, such as forest fires, tornadoes, hurricanes and cyclone blizzards and severe snow-storms, earthquakes, etc.

Where the fractional classes corresponding to the points of deficiency of the water-supply and fire department differ by three classes or more, there shall be added to the points of deficiency a certain number of points varying with the amount of divergence between the classes of the two features as represented in the following table:

Divergence in Classes	Additional Points of Deficiency, Engine Basis	Hose Stream Basis
3	45	
4	90	
5	150	45
6	225	90
7	315	150
8	420	225
9	540	315
10	680	420

Combating the Shade Tree Pests

By S. R. Winters

VARYING from the seemingly harmless efforts of the "measuring worm" in denuding trees of their foliage, to the more pronounced activities of the two-lined chestnut borer in sapping the very vitality of oaks by its mine-tunneling operations, insect depredations upon shade trees in American towns and cities inflict an annual loss of $10,000,000. The toll exacted is both civic and economic in character, and the ravages of a countless variety of pests are of sufficient magnitude to necessitate community as well as individual effort.

The methods prescribed by the Bureau of Entomology, United States Department of Agriculture, for combating these tireless and insidious foes are almost as varied as the kinds of insects enumerated as inimical to shade trees. Spraying devices, used in applying arsenical mixtures, however, constitute an approved mode of warfare, the size of the equipment varying from a hand-operated sprayer for injecting a poisonous solution into newly-opened burrows, to a high-geared spraying outfit for sending the stream of a death-dealing dose to a height of 35 or 40 feet, seeking the destruction of the gypsy moth. Or, as specified in eradicating the elm leaf beetle as an enemy of all species of elm, both community action and costly spraying apparatus are essential. Satisfactory results are insured only when all the trees in a particular locality are treated simultaneously. The winter months and early spring, the trees being dormant, are opportune seasons when organized effort is most effective.

FUMIGATING AND FILLING A CAVITY

When this cavity was opened it was found to be full of borers and fungus cups. A syringe could not reach the borers, so fumigating was used. The tree is now healthy and sturdy

The Elm Leaf Beetle

The elem leaf beetle, enemy of every species of elm, but partial to the common English elm, increases when the buds begin to swell in the spring. It hibernates in the adult or beetle condition in any suitable shelter. The elm leaf beetle works untiringly for a partial or a complete defoliation of trees, apparently being *particeps criminis* with the bark-boring insect whose attacks subsequent to defoliation result in certain death to the stately elm. Not infrequently the activities of the elm leaf beetle in robbing trees of their leaves lead to a slow death. Spraying the trees with lead arsenate when the buds of the elms have burst, repeated two weeks later, is the prescribed method of control. Destroying the pupae at the base of the trees will likewise minimize its numbers. Two generations of the beetle are produced annually, the eggs of the second generation appearing in July.

The Enemies of the Birch

For a quarter of a century or more, private and city parks have been deprived of their birch trees by the inability of the lat-

ter to withstand the attacks of natural enemies. The master offender is the bronze birch borer, whose infestations of the bark and wood are accomplished with the seeming ease with which the mole tunnels through the surface of the earth. The top branches of the birch yield first to the undermining influence, the vitality of the tree gradually deteriorates, and its complete death is accomplished a year or two later. Dying tops, reddish or rusty brown spots on the white bark of the trunk and larger branches, and ridges in the bark, are signs of infestation. The borer, which is particularly destructive to imported birch in parks and lawns of the Northern States, attacks poplar and aspen trees as well. The insect is described by an entomologist as a slender, flattened, footless, creamy white grub, about three-fourths inch long when full-grown, which transforms into a small, slender, olive-bronze, winged beetle nearly one-half inch in length. They spend the winter in a chamber in the wood or outer bark which is a tribute to their excavating powers; emerging from their hibernating quarters the following spring, they are transformed into pupae, and these into adults, which gnaw their way out—oval holes in the bark being unmistakable evidence Trees which have been subjected to extensive ravages not only cannot be recovered, but are a menace to other trees. The badly damaged specimens should be felled and burned during the winter, or not later than May first.

Birch, poplar and aspen trees not beyond redemption can be rescued by spraying with a kerosene emulsion, which destroys the eggs and young larvae before they gain admittance to the wood. The kerosene emulsion, which is equally effective in annihilating insects on some other shade trees, is the result of the following formula: two gallons of kerosene, one-half pound of laundry or fish-oil soap, and one gallon of water. Dissolve the soap in boiling water, remove the solution from the fire, immediately add the kerosene and thoroughly agitate the mixture for five minutes, until it becomes creamy—an emulsion. To each two gallons of water add emulsion: in fall and winter, one gallon; in summer, one-third gallon. Designed to terminate the existence of any insect, it can be applied with a variety of spraying devices, a tin atomizer not being too crude for small trees. Power sprayers with fine nozzles are essential for extensive operations. Any of the standard miscible oils can be substituted for kerosene emulsion as a solution for spraying the bark. By the incorporation of one ounce of sodium arsenate in each gallon of water used for diluting kerosene emulsion or miscible oil, a number of species of tree borers are killed while young, by applying the mixture on the bark.

The Poplar Borer

The poplar borer is an inimical agent in the Middle and Western States, taking toll of the tree to which its name refers. Irregular formation, death of limbs, and the riddling of the trunk of the tree with holes of sufficient capacity to invoke the effectiveness of wind in divorcing its branches from the body, are the results of insect depredations to poplars. The tunneling stage of the borer is accomplished by a yellowish, cylindrical grub, distinguishable from other insects by the presence of numerous fine, short, hard points on a plate immediately back of the head. The larva negotiates mining operations the first year beneath the bark, and during the succeeding couple of years penetrates into the wood. Spraying of infested trunks with kerosene emulsion and digging out and killing the young borers in early fall are prescribed tactics for arresting the invasions of the pest.

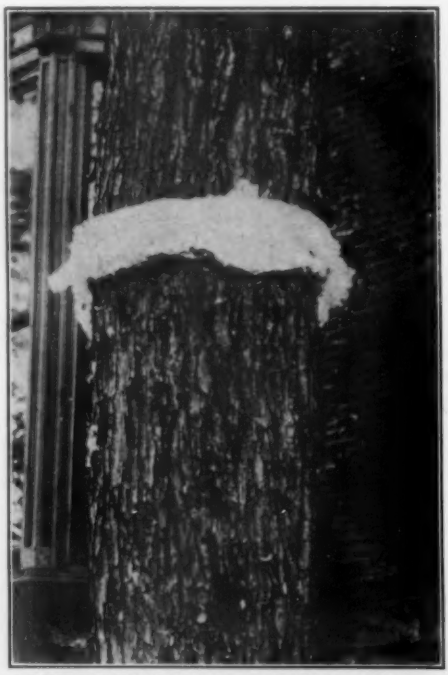
The Hardy Tussock Moth

In spite of an abundance of parasitic insects which are its natural enemies in retarding the multiplication of its kind, the whitemarked tussock moth is of increasing menace to shade and park trees. It has formed acquaintance with a wide variety of trees, evidencing partiality for poplar, soft maple, elm, alder, birch and willow. The marks of its infestations are conspicuous, glistening white, frothy-looking egg masses, located low down on the trunk or on main limbs of the trees. The season for this evidence is from September until the following spring. The caterpillars hatch from overwintered eggs in April and May. Forthwith they begin skeletonizing the leaves, subsequently puncturing holes in the leafy growth and finally devouring all but the main veins. Seemingly, a quirk in nature perpetuates their destructive tactics, making a continuous story. As the tiny

creatures are suspended from a tree by a silken thread, a wind or a passing object may transport the insect to other trees, to continue its devastating efforts. The insect remains a caterpillar for a month or five weeks, shedding its skin five times. The eggs can be destroyed in winter, either by hand picking or scraping them off and burning or by spraying with creosote oil mixed with turpentine to keep it liquid in winter. Another method is to spray the infested foliage with lead arsenate, a violent stomach poison obtainable at seed stores. A barrel pump mounted on a horse-drawn cart with one or two 50-100-foot leads of garden hose and a 10-foot bamboo rod with a spray nozzle at the end will meet the requirements of a small town.

The Bagworm

Shade trees, shrubs and evergreens sustain considerable injury from a caterpillar described as a bagworm, the name referring to the bag-like shelter which is a part of the equipment of the insect for undergoing the changes to which it is subject. After a series of transformations the bags are left clinging to leafless trees. The bagworm has a limited distribution, rarely appearing north of southern New York and the central portions of Pennsylvania and Ohio. Southward, however, it is a troublesome pest in robbing shade trees of their foliage, inflicting serious injuries in New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, Ohio, Indiana and Illinois in 1907. A recurrence of similar serious visitations is not unlikely in the years ahead. The bagworm is most effectually combated by hand picking the bags in winter and burning them, the work being facilitated by use of a 12-foot pole pruner. Another method which has proved its efficiency is to spray with Paris green in the proportion of one pound to 150 gallons of water.



TREE IN BROOKLYN, N. Y., BANDED TO PROTECT IT FROM CLIMBING CATERPILLARS

The Hickory Bark-Beetle

The hickory bark-beetle is the most destructive insect enemy of hickory trees in the eastern United States, taking a toll of millions of trees in recent years. Fading and dying foliage in August and September betrays the ravages of the pest. A notable illustration of its destructiveness in recent years was that achieved in Long Island. The presence of the beetle is unmistakably identified by centipede-like galleries in the inner bark and grooved on the surface of the wood. Trees thus afflicted should be marked and utilized for fuel during the winter. From November to June is the time specified for making effectual this work. "If this is not done, practically all the hickory trees may die within a few years," enjoins Dr. A. D. Hopkins of the Bureau of Entomology.

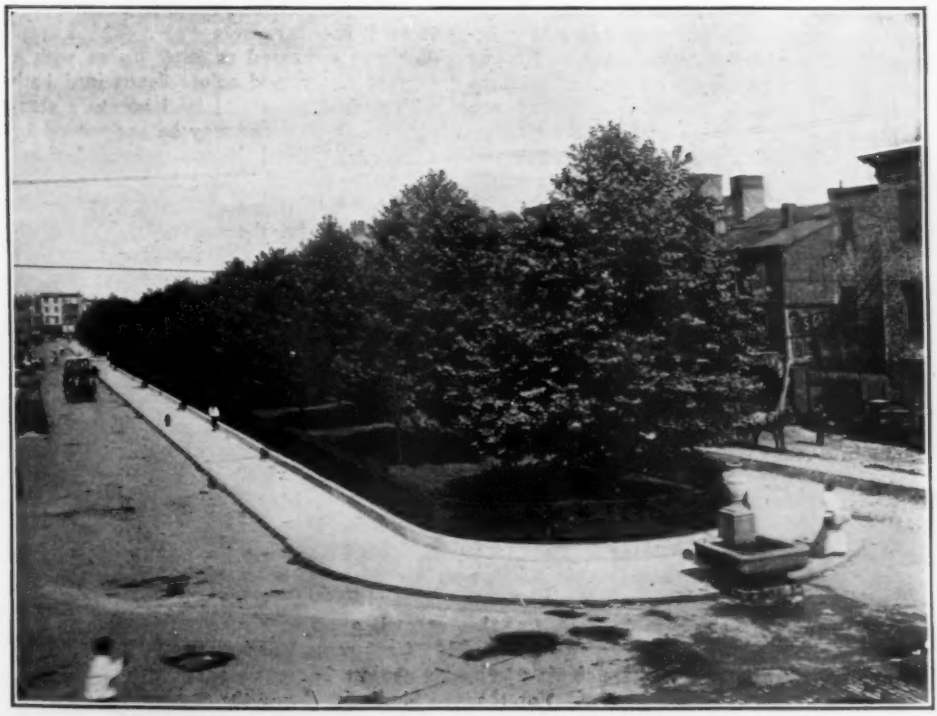
Methods of Control

Other than the application of an arsenical spray with deadly effect, there are numerous artificial methods of control which serve to a relative degree in minimizing the yearly loss of $10,000,000 exacted by insects in exploiting the verdure and vitality of shade trees. The fall canker worm, for illustration, can be successfully combated by placing some sticky substance or cotton bands around the trees as a means of forestalling the ascent of the female to the place where she deposits her eggs. Fortunately, the canker worm is a wingless creature, and its handicap is thus converted into a victory

for shade-tree beautification. The bands are placed in the fall and maintained until the end of May the following year. The cottonwood borer, whose ravages are inimical to the well-being of poplar and willow trees, is forestalled from perpetuating itself by a mechanical arrangement on this wise: A wire screen, up to one-half-inch mesh, is wrapped around the base of the tree, projecting itself about a foot above the ground and several inches into the ground. It fits snugly at the top and is an inch or two away from the bark the remainder of the way, thus preventing the beetles from laying their eggs in it.

Still another method of control is suggested in the warfare authorized on the leopard moth—an imported variety—which is proving a menace to the propagation of shade and ornamental trees along the Atlantic seaboard, from eastern Massachusetts to southern New Jersey, and in the Hudson River Valley. As the moth had intrenched itself in the public parks of New York City, bisulphid of carbon was adopted as a remedy. The larvae of the leopard moth feed on living wood by tunneling operations rather than feeding on foliage; consequently, bisulphid of carbon is inserted into the apertures made by the pest, and the openings are forthwith closed with various substances. The death-dealing dose is injected into the burrows by a long-spouted oil can or a small glass syringe, which has the added convenience of determining the amount of bisulphid, and there is no threading to be injured by the reagent. A teaspoonful of the liquid is injected into each burrow. Putty and moist clay are ineffectual in daubing the holes and thus sealing the liquid, grafting wax being recommended as satisfactory. Coal tar can be used as a substitute, or the holes may be sealed by inserting a wooden plug and sawing it off even with the trunk of the tree. The object desired is a stopper, tight enough to exclude rain and the entrance of other injurious insects.

Breathing-Spaces in City Streets



A FEW TREES ADD TO THE BEAUTY AND COMFORT OF A CITY STREET

Color Characteristics of a New England Water-Supply

An Analysis of Various Feeders Provides Interesting Data for the Consideration of Municipal Engineers and Water-Works Superintendents

ONE of the matters which has to be given serious consideration in the choice of treatment of a water-supply is the question of color. While this is important only from the esthetic standpoint, still it is hard to secure the approval of citizens where the water delivered to consumers has a pale amber color in a drinking glass when resting on a white cloth. A color of less than 10 is practically always insisted upon. It has been found, however, that people accustomed to color of 15 to 20 become greatly pleased at a reduction, and should any recurrence of the higher colors appear, there is usually a great hue and cry.

Caleb Mills Saville, Chief Engineer, Board of Water Commissioners, Hartford, Conn., has given some very interesting data in a paper read before the annual convention of the New England Water Works Association, in September, 1920. He described the development of the Nepaug Reservoir, which is one of the late additions to the Hartford water-works. There are three principal streams entering the Nepaug Reservoir—Clear Brook, Phelps Brook and the Nepaug River. Clear Brook is a small, rapid stream draining an area of about 1.05 square miles and having its beginning in heavy gravel deposits. Only a very small amount of swampy land is tributary, and the color of the water rarely goes above 15, except in the spring of the year or under condition of storm run-off. Phelps Brook drains an area of about 2.9 square miles. There are several rather extensive swamp areas on its watershed, which account for the high colors recorded on the table reproduced herewith.

The Nepaug River drains an area of about 23.9 square miles. The course of the main stream is rather flat for this region. Where there are rather extensive meadow lands bordering, there are no areas of swamp or marsh land. Several tributaries, however, have their rise in somewhat extensive high swampy lands, and from these comes much of the color in the main stream. For the twelve months ending August 1, 1920, the average and median colors are 30.5 and 31 respectively, with a minimum of 10 during the snow and ice run-off period, and 50 in June and November, the former due to a severe downpour of rain, and the latter to seasonal conditions.

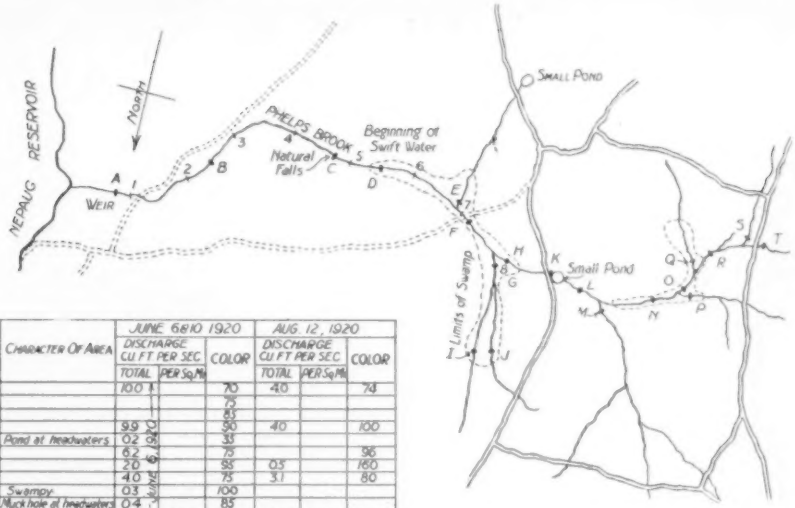
Phelps Brook Conditions

The accompanying sketch shows the principal part of the Phelps Brook watershed, and on the left is a table giving information obtained from observations made on two different occasions. A study of this shows some interesting facts which indicate the origin of the high color of this stream and suggest economical remedies.

Two of the larger swamp areas are enclosed in irregular doted lines. At "A" is located a permanent weir with an automatic recording device, and there is a rain-gauge located not far from "M". The stream flow was measured at other places with a current meter, and colors determined both with a field glass and by laboratory comparison. Conditions may be understood by a brief analysis of the data tabulated.

Starting at "T," there is a color of 60 with a run-off of 9.4 cubic feet per second. A branch from the south, "S," brings a color of 22, and the combined color at "R" is found to be 55 at the head of the swamp. The several branches leading into this swamp differ considerably in color, "A" and "P" ranging as high as 75 and 90 repectively; the combined color at "N" with a flow of 0.9 cubic feet per second being 65. Nearly half of the water producing this color comes from the high-colored tributaries "P" and "Q." It is evident, therefore, that the first steps toward improvement should be taken on these streams. "M" with 0.4 cubic feet per second and a color of 55 mingling with the 65 color of "N" with its flow of 0.9 cubic feet per second, gives at "L" a total of 1.3 cubic feet per second and an actual color of 63 as against 63.5 color computed.

Similarly, down the stream high colors coming from "I" and "J" combine at "G"



POINT	TRIBUTARY AREA Sq. Mls.	CHARACTER OF AREA	JUNE 6 & 10 1920 DISCHARGE CU. FT. PER SEC. TOTAL	JUNE 6 & 10 1920 DISCHARGE CU. FT. PER SEC. PER Sq. Mi.	JUNE 6 & 10 1920 COLOR	AUG. 12, 1920 DISCHARGE CU. FT. PER SEC. TOTAL	AUG. 12, 1920 DISCHARGE CU. FT. PER SEC. PER Sq. Mi.	AUG. 12, 1920 COLOR
A			10.0		70	4.0		74
B					75			
C					85			
D			9.9		90	4.0		100
E		Pond at headwaters	0.2		35			
F			6.2		78			98
G			2.0		85	0.5		160
H			4.0		75	3.1		80
I		Swampy	0.3		100			
J		Muck hole at headwaters	0.4		85			
K			3.6		63	2.1		90
L			1.3		63			
M		Flat, Partly wooded	0.4		55			
N			0.9		63			
O			0.6		60			
P		Swamps at headwaters	0.3		75			
Q			0.1		80			
R			0.5		55			
S		Steep Wooded			22			
T		Swampy	0.4		80	0.5		75

Note - Points K&L are approx. the same. The reason the flows are so different is because they were taken on different days.

THE PHELPS BROOK WATERSHED WITH TABLE OF COLOR CHARACTERISTICS

in proportion to their discharges, and "G" combined with "H" produces a color of 75 at "F." "E" stream entering below "F" undoubtedly has some influence in reducing color, but the long swamp area to "D" is more than sufficient to counteract it. It appears from this study so far that streams "I" and "J" also will repay attention and that probably best results both in affusion and economy can be had here by attacking the entering streams before advancing to the more extensive swamp areas.

A most interesting phenomenon was observed in connection with this work, and duplicate observations were taken to make sure that there was no error either of observation or amount of water flowing in the stream. The elevation of the weir "A" is 516, while that of a point about 4,000 feet west along the brook, or 700 feet east of "C," is 675, a difference in elevation of 159 feet in 4,000. On June 6, the flow at "A" was 10 cubic feet per second, and the color 70. At "D" the flow was 9.9 cubic feet per second, with color 00. No elevation was taken at "D," but the brook has little fall between "C" and "D." With practically the same flow at the two stations there was a reduction in color of 20.0. On August 12 check observations were made; the flow at "A" was 4 cubic feet per second, with color 74; the flow at "D" was 4 cubic feet per second, with color 100, a difference of 26.

As there are no entering streams between "D" and "A," and as the gagings show no appreciable inflow of low-colored spring water, the conclusion seems warranted that because of the swift water from "D" to "A" there is a reduction of color from 20 to 26 points in a distance of about one mile. Similar work to the above is being undertaken on the Nepaug River stream, and as maintaining forces are available, work will be done from time to time, attacking first those locations where the greatest amount of color is evident. A survey of this character is comparatively inexpensive and often results in much economy by undertaking work to remedy the root of the trouble rather than starting on the more spectacular project of extensive swamp drainage. The latter is often disappointing in failing to get results commensurate with outlay because of lack of careful diagnosis.

The Change in Attitude of the Public and Public Service Companies Toward State Regulation

By Farley Gannett
Gannett, Seelye and Fleming, Harrisburg, Pa.

A FEW years ago a lawyer friend of mine, whose specialty was corporation law, and whose practice was largely before state regulatory commissions, told me this incident in his practice.

One day the President of probably the largest utility in the state came to him to retain him to assist in putting a rate increase through the Public Service Commission. This was a most attractive and valuable commission, and one most desired by many attorneys and particularly so by my friend, whose practice was young but growing.

The lawyer thanked the President and asked why he came to him when the utility's regular attorney, a man of national reputation, was still under retainer and able to look after his client's affairs. The President replied that he wanted them both; that he recognized that my friend specialized in this class of work, resided in the state capital city, and would be of much value to his company. My friend again thanked the President and declined his retainer, much to the latter's astonishment. When asked his reason, he said that he could not take the case unless he took it alone; that he recognized the ability of the company's regular attorney, who, however, had not yet learned that public utilities were under state regulation, and he was too old to learn it. The old attorney has since passed on, and my friend's firm now represents the utility.

There are still many lawyers who cannot make up their minds to the new idea of state regulation; and there are probably more operators of utilities who cannot. The older men are passing on or becoming convinced of the actual conditions, and these last few years have seen a vast change in their attitude. The utility has learned that far more can be gained by playing fair and honestly with the commissions and the public than by practicing subterfuge, withholding facts and attempting to befuddle the authorities.

When governmental control of public service corporations was first discussed some twenty years ago, the idea was quite generally objected to by the companies. Gradually this attitude was modified and softened until most of the states enacted laws organizing public utility commissions. The older men in the business could not at first understand or countenance interference in their business by the public utility commissions. The rising prices of recent years have, however, so brought home to them the advantages of state control that they fear and dread the possibility of losing such control, which carries with it protection. In other words, they see that it is not one-sided control. The company is controlled, but so is the public. The commissions have prevented the public from keeping rates fixed by ordinance or agreement at such low levels as to drive the companies into receiverships.

Utility Commissions Act as Buffers

And now the utilities fear that the Legislature of Illinois may do away with the Public Utility Commission of that state. They fear that by so doing the utilities will become "a political football." They want the protection of the Commission, even though they do sometimes reduce the profits, operating salaries and management fees, and criticize managerial methods of the utilities. Utilities realize that it is due to the public utility commissions alone that many of them are able to live and do business.

These are of course hard days for the public service commissions, called into being by the public to prevent undue profits by monopolies, and to protect those monopolies, recognized as properly so, in their investments. These commissions for the last few years have had to say "yes" to the great majority of applications for rate increases, because of advancing costs of operation and maintenance. The public is dissatisfied with the creature it created. It is not keeping rates for gas, water, electricity, trolleys and telephones down, but constantly permitting them to mount higher and higher.

If it had not been for the public utility

commissions, where would the utilities be to-day, with their ordinances calling for five-cent fares, fixed water and gas rates, etc.? Imagine the controversies between city and company officials when attempts were made to alter existing ordinances. The situation in New York between the Mayor and the trolley company would have been repeated thousands of times. As it is, a great many public utilities, chiefly gas and trolley companies, have succumbed and gone into receivers' hands, but how many more would have done so were it not possible in many states to forget ordinances and contracts which set rates and fall back on the power of the public utility commissions to regulate them equitably! Thus, that which was the protection of the public a few years ago is now considered by the public to be its menace, and that which in the mind of the utility operator menaced the life of the utility and took away its individuality and independence, is now its protector.

If costs have really started to reach a permanently lower level, the utilities have the prospect of lower operating and maintenance costs before long. Will they be as quick to reduce rates when costs are lower as they have been to raise them—and should they? There is a lag between the time increased rates are needed and the actual results of rate raises. In those states where the law provides that approval must be obtained before rates are raised, this lag is great and its effect sometimes disastrous. In those states where new rates merely have to be filed thirty days in advance of the date they are effective, the lag is not so great, but it is considerable, for it sometimes takes months to get the new schedule in shape for filing.

Utilities may be pardoned in some cases if they postpone rate reductions until after they have recouped the losses incurred during this period of lag, but as a rule the companies will probably not rush to reduce rates, and we may expect that the cities will before long begin actions before the commissions, asking for rate reductions based on reduced operating expenses. Thus, before many years, or it may only be months, the commissions will have a chance to square themselves with the public by ordering rate reductions in the majority of cases which come before them. When this time arrives, will the utilities then attempt to oust the commissions, as the public is doing in some states now? I do not think they will.

It is to be hoped that the utilities will carefully watch their balance sheets and will play the game to the extent of keeping the rates down on the basis of reduced cost of service if that cost does become less. It is to be hoped that they will not wait to be driven down by complaints to the commissions, and it is also to be hoped that the public will be patient and give the utilities time to recoup some of the money lost during the lag period, before starting suits before the commissions asking for reductions.

It may be fairly said that public utility rates did not rise as rapidly or as high as wages and prices of most other commodities did during the war, and subsequently. Perhaps some of the companies were earning so well under pre-war conditions as not to need much increase, and didn't want to run the risk of valuations by commissions. Others hoped that costs would soon cease their upward trend and start down, and thus postponed rate revisions. There are a large number of companies which have not increased rates at all during this period.

All in all, it would seem, when the problem is studied as a whole, that the public utility companies have come through the trying period of the last three years with a record which the public should appreciate. This situation should be made clear to the public by someone who is willing to collect the data, and the result would be to put the utilities in a good light in the eyes of the understanding section of the public. Now the utilities must not mar this record by trying to make the increases, which have been necessarily made, permanent—a permanent additional burden on the public. Of course the utilities are not entirely responsible for their good record during the war, as to increased rates. Had there been no commission control there would probably have been chaos. Some companies, which could do so, would have undoubtedly advanced rates out of proportion to rising costs, while others, those which had their rates bound by contracts and ordinances, would have succumbed and gone into receiverships. The fairly even tenor of the way of the utility during the war and post-war period can be credited to commission control. It has kept increases reasonable, and far below the increases in most other things, and at the same time it has saved the financial life of innumerable corporations.

Street Flushing for Cleanliness

Descriptive Material and Cost Data of Value to Municipal Officials

STREET flushing is being increasingly used by cities throughout the United States, supplanting the inefficient hand-sweeping method. Power flushers wash the surface of asphalt, brick, and concrete and other hard-surfaced pavements by directing streams of water from fan-shaped nozzles under pressure onto the pavement, chiseling off the dirt, scraping the surface, and carrying the refuse into the gutters. The pressure at which the water is thrown onto the pavement is obtained from a separate gasoline engine mounted between the driver's seat and the tank, which makes it entirely independent of the truck engine.

The flushing units are so made that they can be used with one, two or three nozzles operating at a time. Three nozzles are used to clean the street from curb to curb on one trip, using one front and two side nozzles. Two nozzles are used at one time when cleaning exceptionally wide streets or streets having car tracks in the center. In this case the left front and right side nozzles should be used, or vice versa. Only one nozzle is used when an exceedingly high pressure is required for spring clean-up or for streets which would ordinarily require a scraper to remove the dirt.

When streets are covered with dirt that is hard and dry and baked to the surface, it is well to sprinkle before flushing in order to soften the material, which increases flusher efficiency about 50 per cent. Flushers are also equipped with sprinkler heads located at the front of the machine and fitted with a three-way cock, so that the operating levers controlling the front nozzles can be used to control the sprinkler heads also. These sprinkler heads throw a wide fan-shaped stream in front of the truck, covering a strip of 60 feet, which can be decreased to 30 feet by reducing the speed of the flusher engine.

The first method of street cleaning used was the "White Wing," the man with the push broom and cart. This is also the most expensive when present-day labor costs are considered. One motor-operated flusher can do the work of 20 White Wings. Horse-drawn sweepers were formerly used quite commonly up to the time flushers were placed on the market, but this method does not remove the fine particles of street dust, which is readily blown about by the wind. One flusher can do the work of about six horse-drawn sweepers.

Operating and Cost Data

In Cedar Rapids, Iowa, the flushers begin to operate at 4 o'clock in the morning. The first territory to be cleaned each day is the business district, and this is done at the early hour to avoid the heavy traffic. During the day from 8 o'clock the residence district is taken care of, covering about 60 miles of paving. The flusher covers this territory once every 12 days. Two men are employed on the flusher at an average daily expense of $15. The dirt forced by the flusher into the gutter is picked up by a gang that follows the machine continually. Flat sewers do not permit the flushing of this dirt into the catch-basins, so that it is necessary to clean out the gutters continuously.

In Waxahachie, Tex., 71,000 square yards of street are flushed daily by a Pierce-Arrow truck with Studebaker model flusher. This machine has been in operation since June 1, 1919, and the total cost for repairs and parts to date has been $36. It is operated by a competent man, who is very careful, and the streets are kept exceptionally clean.

About 2 miles of paved street in Tyler, Tex., are flushed each night, with the exception of Sunday night. This usually requires about 6 hours per night and about 30 tanks of water to do the work. The flusher is equipped with a 1,200-gallon tank. During the summer months the flusher is used during the day as a sprinkler in order to lay the dust on public streets, and covers about 2 miles a day in this way, twice each day. The expense of operation of the flusher averages about $350 a month.

The city of Chicago operates one double-unit flushing equipment and a single-unit, both of which operate satisfactorily. These machines were delivered in September, 1920, and have been operating in the down-town section of the city. Twelve miles of streets are flushed nightly between 10 P. M. and 6

A. M. at a cost of 13.4 cents per 1,000 square yards. Six additional Mack flushers will be put into commission this spring, and will radiate from the business section on the principal thoroughfares, serving a district approximately 11 miles long by 4 miles wide, each flusher working 16 hours per day.

The Department of Streets and Public Improvements, Des Moines, Iowa, reports that the cost of operation depends considerably upon weather conditions, but conservatively, during an 8-hour period they are able to flush approximately 78,600 square yards with 34,000 gallons of water. It takes approximately 20 gallons of gasoline and 2 gallons of oil for the same period, which includes the amount used in the auxiliary motor as well as for the truck proper. This, with the wages of the operators, amounts to $10.12, constituting the total expense of operating outside of maintenance, which has been very slight in the two years the machine has been operated.

The Department of Street Cleaning, Richmond, Va., reports that under test the flusher showed the following results: The machine was in operation 237 minutes, of which 63½ minutes were used for loading, 75 minutes were used for discharging, and 98½ minutes spent in backing, starting, etc.; 17 tank loads were distributed, making a total of 25,000 gallons used for flushing, and 10.75 blocks were flushed per hour. The following table gives the cost of operation of this machine per 8-hour day:

Auto driver	$4.50
Helper	4.00
Gasoline (15 gallons at 29 cents)	4.35
Oil	.35
Grease	.10
Depreciation ($8,500—15 per cent)	3.50
Interest (6 per cent on $8,500)	1.40
Total cost per day (8 hours)	$18.20

STREET FLUSHER AT WORK IN TYLER, TEXAS, WITH TWO NOZZLES OPERATING

The Bureau of Streets, New Haven, Conn., uses a 5-ton Larrabee chassis with Studebaker attachment. The average results accomplished by this machine in a 9-hour day are as follows:

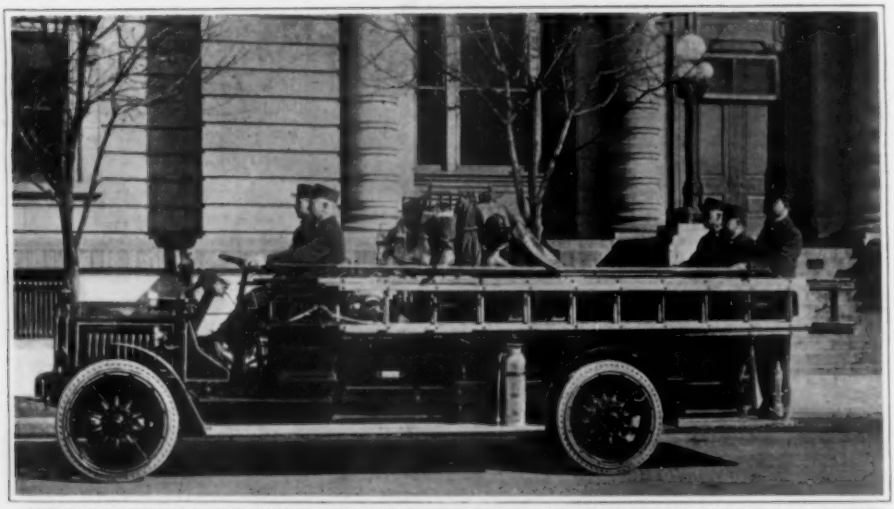
Street area flushed	303,713 square yards
Street area sprinkled	46,058 square yards
Amount of gasoline consumed	17 gallons
Amount of oil consumed	1½ quarts
Wages of driver	$4.50 per day
Wages of helper	$3.50 per day

The Value of a Gravel Survey

Iowa gravel hunters working under the direction of the State Highway Commission, undoubtedly saved the state of Iowa on the construction work of 1920—to say nothing of additional savings in this and later years—more than $100,000. In this survey undeveloped gravel deposits were examined in 24 counties, and searches made for entirely new deposits.

How Near Complete Motorization Are Your Municipal Departments?

A SELDEN CHEMICAL AND SERVICE TRUCK USED BY THE FIRE DEPARTMENT OF CANASTOTA, N. Y.

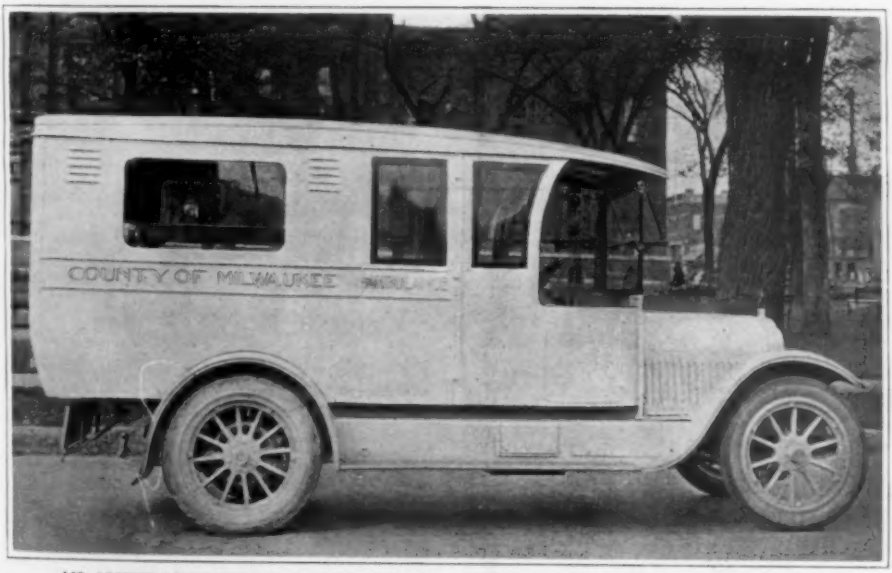


ONE-TON PACKARD CHEMICAL AND HOSE TRUCK PUT INTO SERVICE MARCH 1, 1916, BY THE CITY OF ELGIN, ILL.

The truck is equipped with one 40-gallon chemical tank, 200 feet of ¾-inch chemical hose, two 16-foot trussed roof ladders, one 26-foot rope hoist extension ladder, one 10-foot ladder, two pike poles, 900 feet of 2½-inch hose, nozzles, etc. Weight 9,100 pounds. No. 2 and No. 5 trucks of this department are of the same type and were put in service in April and October, 1916; maximum speed 37 miles per hour; on October, 1920, No. 3, a Nash-Quad four-wheel drive with same equipment and a maximum speed of 27 miles per hour

MOTORCYCLE POLICEMEN AND PATROLS IN FORMATION FOR REVIEW

NASH-QUAD TRUCK HAULING LEE TRAILERS FOR PROVO CITY, UTAH, ROAD WORK



AN AMBULANCE FOR MILWAUKEE COUNTY, WIS., MADE BY THE WHITE COMPANY

Motorization of New York City Departments

By Rebecca B. Rankin
Librarian, Municipal Reference Library, New York City

IN the November, 1920, issue of THE AMERICAN CITY there appeared an article entitled "Motorizing American City Departments." Here attention was called to the use of the passenger automobile as a means of speeding up the various departments of the city administration. The Municipal Reference Library has made a survey of the city departments of Greater New York, ascertaining the number of automobiles used by the various departments. The following data are given to supplement the above-mentioned article. As is to be expected, since the city of New York is the largest in the country, the use of the automobile is also greater than in any of the other cities as shown by the National Automobile Chamber of Commerce survey. In that survey Detroit stands highest, with a total of 616 pieces of motor apparatus. New York City has a total of 1,608 motor vehicles; of this number 326 are passenger cars. The ambulances used by the city number 51, and there are 107 police motorcycles.

The Fire Department seems to have been the first to consider using motor vehicles instead of horses. It was done for the saving effected in maintenance. In 1910 the Department experimented with one motor high-pressure hose wagon; it cost for maintenance and fuel for one year only $85, and maintenance of horses necessary for the same apparatus would have cost $660. The Fire Department is now 80 per cent motorized, and there are no fire horses used in the borough of Manhattan.

In the table below, the motor vehicles are classed roughly. Under the heading "Trucks" are included fire trucks and dumpers; with "Patrol Wagons" are included hose wagons; with "ambulances" are prison vans. In the case of the Street Cleaning Department the new snow-cleaning apparatus which has recently been ordered but not yet received is included under "Trucks." Two garages are now under construction, and thirteen others are being planned for the housing of this street-cleaning equipment. The appropriation of $4,000,000 for this purpose by the Board of Estimate and Apportionment which was made on June 4, 1920, includes money for the building of one central repair shop and twenty-two garages.

Despite all the care that has been used in acquiring and compiling this information concerning motorization, we cannot vouch that it is entirely complete nor without inaccuracies. It has been necessary to omit one or two departments from which the figures could not be obtained. At least, it approximates the actual conditions in New York City departments.

MOTOR VEHICLES OWNED BY CITY OF NEW YORK SEPTEMBER, 1920

	Ambulances	Passenger Cars	Trucks, Including Fire Trucks and Gasoline Pumpers	Motor-Cycles	Patrol and Hose Wagons	Tractors	Delivery Wagons and Working Cars	Totals
Ambulance Service, Bd. of	10	...	...	...	...	...	...	10
Botanical Garden	...	2	...	...	...	...	...	2
Corrections	11	1	...	...	...	...	3	15
Docks and Ferries	1	1	...	...	...	...	...	2
Education	...	12	8	...	...	...	...	20
Fire	...	91	132	...	137	162	28	550
Health	8	8	12	...	...	...	...	28
Hospitals	19	1	2	...	...	...	...	22
Municipal Garage	...	81	...	...	...	...	...	81
Parks	...	9	41	...	...	...	...	50
Police	...	39	...	107	29	...	...	175
Public Libraries	...	2	...	...	...	...	4	6
Public Welfare	2	...	2	...	...	...	10	14
Public Works	...	12	44	...	...	...	...	56
Street Cleaning	...	31	347	...	...	23	...	401
Water Supply, Gas and Electricity	...	36	62	...	...	2	74	174
Zoological Garden	...	...	2	...	...	...	...	2
Totals	51	326	652	107	166	187	119	1,608

Efficient Industry and Wholesome Housing True Aims of Zoning

By Thomas Adams

Town Planning Advisor to the Commission of Conservation, Ottawa, Can.

THE phase of city planning which appears to have caught the public fancy to the greatest degree in recent years is that known as "zoning" or "districting." Zoning has been defined as "determination of the character and intensity of the use of land" and involves the division of cities and towns into different districts for the purpose of regulating the height and use of buildings and the percentage of the lots occupied by buildings. In any regional or city plan, zoning must be an important feature. The early plans prepared for cities in the United States and Canada were chiefly defective in that they omitted to deal with the control of the character and intensity of use of land for building purposes. No matter how good the plan of the street system of a city may be, it will be an imperfect plan if it does not include both the control of the building development and the adjustment of that development to the plan of the transportation and street system.

The Defects of Earlier Plans

In earlier plans the emphasis was placed on transportation, park systems, and civic centers, and little, if any, attention was given to equally important and more fundamental phases of the industrial and residential development of the cities. This resulted in many good transportation schemes lacking permanence in meeting the problems for which they were designed to find the solution. In so far as the plans were confined to partly esthetic purposes, such as parks and civic centers, they have usually failed to obtain sufficient support to bring them to fruition because of having these purposes dealt with apart from the other parts of city development. The present tendency is leaning towards the other extreme, and in some places where zoning is being carried out the error is made of dealing with the segregation of industries, business and residences as a separate thing from, or even without relation to, such matters as transportation, main arterial highways, housing and parks.

Transportation and Zoning

The railroad system of transportation and termini within and about the city and the arterial system of highways which provides the main means of communication by road for the city are of exceptional importance in relation to the zoning plan of a city. Both have a direct bearing on the segregation of industrial areas and on the convenience of the means of transit between these areas and the homes of the people.

We shall fail to plan properly so long as we ignore the fact that the fundamental matters for study and planning in the city are industries and homes. The means of transportation is an essential service, but only a service to procure efficiency and health in the industries and living conditions of the people. The park system is an essential service for the same object. The lesson has still to be learned that regard must be paid to all the elements of civic growth in a proper city planning scheme and that zoning should not be considered as a thing apart from other aspects. This does not mean that the writer lacks appreciation of the enormous benefits which are being conferred on some American cities as a result of the zoning that has been carried out independently of a general city plan. Where the zoning schemes, however, have been based on an adequate and comprehensive survey and have been part of a general plan, they possess the elements that are likely to make them really effective and enduring in good result.

Preliminary Survey Essential

Whether or not a city prepares a complete plan or confines itself to a zoning plan and ordinance, it should at least have made a survey not only of its own area, but in some degree at least of the adjacent region, as a first step. No successful and equitable form of land and building classification and control can be made without adequate studies of the existing conditions, accompanied by expert study of the tendencies of development. It is interesting to observe

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that in America zoning is largely confined to the built-up part of cities, whereas in England it forms the most important part of town planning schemes for unbuilt or partially developed land, and has little connection with areas already built upon. Both the American and English systems are defective in respect of what they omit. The best planning combines the advantages of both systems and place the emphasis neither on the land built on nor on the undeveloped land.

Control of Suburban Development

Probably there is no greater problem on this continent than that of the control of new development in the suburbs, and this involves that zoning regulations should be made in respect of future building development in suburban and semi-rural areas as well as in respect of land already covered with buildings. Indeed, the greatest opportunities for successful zoning are those which are available in the undeveloped and partially developed suburbs surrounding great cities, where vested interests in existing buildings have not yet been created. The question of zoning cannot be separated from the question of industrial distribution. In all large cities there is going on a certain amount of decentralization of industry, and the worst evils of bad development are occurring in the outer suburbs where new industrial development is taking place.

Segregation Must be Scientific and Not Anti-Social

There are two important considerations in connection with zoning which have not yet received sufficient attention. One relates to the social problems that will arise in connection with the segregation of residential districts. It will be an unfortunate result of zoning if it divides cities into sectional groups of rich and poor to a greater extent than at present. The ideal to aim at is to prevent the erection of one kind of building that will injure another kind of building, with a minimum regard to the social status of those who live in them. Zoning will defeat itself in a democratic country if it becomes anti-social, or emphasizes distinction of class, as a movement.

The second question is, whether by zoning industrial districts, without regard to the general city plan, industries will be segregated still more than at present from the homes of the workers. The segregation of industries into one part of the city will be a bad and not a good thing if it is done without adequate care of the housing conditions and convenience of transit for the workers. This is not only sound from a theoretical point of view but is the practical judgment of manufacturers, and it has been the only reason they have put forward in opposition to zoning. In zoning a city as part of a comprehensive plan, the expert who knows his business would segregate the industrial and residential areas and yet so relate them to each other and the system of transportation that the workers would be within easy reach of their places of employment. What matters most is not the distance men live from their work but the time it takes them to get to and from it. Proper zoning would have special regard to the necessity for giving the manufacturer housing accommodation near to his plant, which is one of his biggest problems. The representative of a large industrial corporation in America, writing of the kind of industrial zone which is sometimes created says:

> "The question of transporting employes from their homes to the factory is daily becoming more burdensome, due to the increased cost of labor and materials, so that if the workmen live at a great distance from their work they are not only occupying a greater length of time going to and from their work, but the fares on the steam railway or tram system are absorbing a large amount of their pay envelopes."

For that reason he said he was opposed to zoning. Of course a zoning system that would lead to this result would be wrong, but it is precisely the result that proper zoning would avoid if it were carried out as part of a general city plan. Our danger is that in doing the thing that is most expedient at the moment we may fail to do the thing that will be permanently practical and profitable. Efficiency of industries and wholesome housing are of vital importance in the development of the city; other things are vital in proportion as they minister to these things. The kind of zoning scheme that has for its main object the stabilizing of real estate values, essential as that is, will accomplish little in improving a city unless it simultaneously develops the facilities for carrying on the industry that is the *raison d'être* of the city and improves the convenience and health of the home life of the average citizen.

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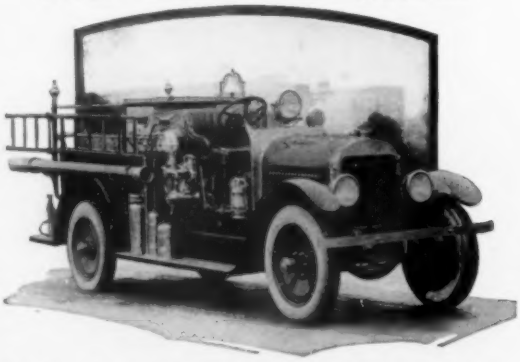

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State Referenda and the Municipalities in the 1920 Elections

By William A. Robinson
Department of Political Science, Dartmouth College

NOVEMBER 2, 1920, saw the submission of the usual biennial list of constitutional amendments and statutory enactments on already overburdened state ballots. In addition, the municipal voter was called upon to pass judgment on a variety of purely local projects. Most of the state propositions were of interest to the municipal electorate. When West Virginia, New Jersey, Missouri or Idaho authorizes huge bond issues for highway construction, it is naturally a matter of serious interest to their municipal taxpayers, who usually contribute more than their fair proportion of state taxes. The same is true of the soldier's bonus authorized in half a dozen states, or the income tax amendments rejected in Minnesota, Maine and New Hampshire. But in addition to such measures which are of interest to the city voter in the states concerned, there were a few propositions of general interest to those concerned in municipal activities.

SUBJECTS INCLUDED AMONG THE 1920 REFERENDA

- Hours of Duty for Firemen
- Platoon System in Police and Fire Departments
- Election of Charter Commissioners
- Debt Limitations and Municipal Ownership
- Debt and Tax Limitations
- Excess Condemnation
- Compulsory Attendance in Public Schools

Some measures illustrate the fundamental weakness in the relations of state and city and constitute a strikingly effective argument for home rule. The voters of Colorado, for example, voted favorably on an initiated measure making it unlawful to require employes in any municipal fire department to remain on duty in any calendar month more than an average of twelve hours a day except in time of emergency. In Louisiana, the voters accepted an amendment to the constitution directing the city of New Orleans to levy annually a tax not exceeding two mills on the dollar for the inauguration and maintenance of the double-platoon system in the fire department and the triple-platoon system in the police department, and for the increase of salaries and wages in both. In such cases a system which allowed municipalities a free hand in settling their own employment problems would seem desirable.

Missouri voted for two important constitutional amendments. The first allows cities having a population of more than 100,000 a simpler method of charter making, providing for the election of the charter commission on a non-partisan ballot after nomination by petition. The second permits cities of over 75,000 population to acquire water-works, gas-works, electric light works, street railways, heating, ice, or refrigerating plants or other public utilities, without conflict with prior debt limitations. South Carolina also adopted an amendment empowering cities and towns to acquire and operate ice plants.

Meeting the Increased Costs of Government

In a number of states the growing demand for improvements and the increasing cost of government have led to proposals to relax both debt and tax limitations. Pennsylvania voted for an amendment placing a debt limitation on counties, cities and boroughs of 7 per cent of the taxable valuation, with 10 per cent in the case of Philadelphia, and an additional deduction of debts incurred for income-producing property. Wyoming, on the other hand, voted down four amendments authorizing increased tax levies and larger debts, accepting only the proposition that school districts might create additional indebtedness for the erection and enlargement of school buildings. South Carolina voted for the modification of constitutional debt limitations applying to more than twenty cities and

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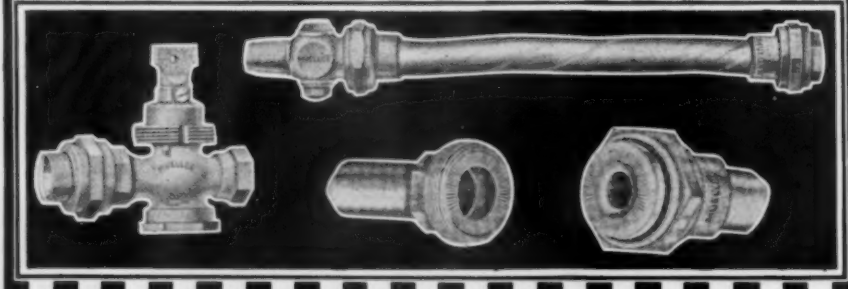

towns. Virginia voted to allow an increase of local taxes for school purposes.

In Michigan there were two amendments of considerable interest. One was a decidedly dangerous proposition, which, under the form of compelling attendance at the public schools of all children between five and sixteen years of age, would probably have necessitated the suppression of parochial and other private schools. While it is satisfactory to record the rejection of this measure, the same is hardly true of the defeat of the other. This authorized the Legislature to empower cities, subject to reasonable limitations, to condemn and take the fee to more land and property than is needed in the acquiring, opening and widening of parks, boulevards or land for other public uses, and to sell or lease the remainder after such improvements are made, any bonded indebtedness so acquired not to be included under any limitations on indebtedness, but to constitute a lien only in the property so acquired. Excess condemnation has definite possibilities and advantages of which few American cities have been free to avail themselves, and it is to be regretted that it could not have been tried out in Michigan.

In Louisiana and Oregon constitutional amendments were submitted providing for an improved and consolidated administration of the respective ports of New Orleans and Portland. In the former state the amendment was adopted, in the latter defeated by a narrow majority. In Louisiana the only amendment failing to carry, out of eight submitted, was one proposing a ten-year tax exemption for industries locating on the Navigation Canal.

Virginia, in defining qualifications for voting and office holding, accepted an amendment exempting from residence and voting qualifications office holders under municipal governments of whom special or technical learning is required. By other amendments women were declared eligible for the office of school trustee, and a greater measure of power in adopting charters was granted to municipalities.

In California and Oregon single tax amendments were decisively beaten, together with anti-compulsory vaccination proposals. The latter state also defeated an initiative measure creating a State Market Commission for the purpose of promoting better relations between the agricultural producer and the ultimate consumer. South Dakota accepted an interesting amendment proposing to use the credit of the state for the acquisition of urban homes, an extension of the same principle involved in the rural credits scheme now in operation.

These measures are of course of direct municipal interest, but it must be evident to anyone who has examined the mass of measures submitted in some of the states that the municipal voter has a special responsibility. The urban electorate has more access to sources of information on public questions, and conflicting interests are better balanced. If, as seems likely, the burden of direct legislation and the referendum is to grow, the municipal voter with his advantages in the way of political education has unusual opportunities of service to the state. The growth in public indebtedness and taxation is ominous; the general willingness to authorize expenditures or to demand increased public services is aggravating a situation already serious. The municipality in most states is carrying a disproportionate share of public burdens. Self-interest alone should demand a careful weighing of measures and a vigorous participation in state politics.

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—*Public Health News*, New Jersey State Department of Health.

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Hydroelectric Power for American Cities

By James P. Wells

Consulting Engineer, Rochester, N. Y.

DURING the last ten or fifteen years much has been said about developing the water-powers of the United States. There has been considerable legislation, a vast amount of material printed on the subject and a great volume of oratory. In spite of all this, only a relatively small amount of the water-power available in the country has been developed. At the present time there is again a widespread agitation for the development of water-power, and it is worth while to mention some of the structures used in modern hydroelectric development, and to outline the preliminary steps necessary toward developing water-power.

Certain structures and machines are necessary in the construction of almost every hydroelectric power-plant: first, there must be a dam of some nature; second, a conduit to carry the water from the dam to the turbines in the power-house; third, hydraulic machinery to develop the power; fourth, electrical generators to manufacture electricity; fifth, a transmission line. The size and character of these different factors will depend upon the particular conditions.

Dams and Conduits

There are several types of dams. There is an earthen dam with a concrete core wall in the center. Under certain conditions this would be the most economical construction. There are the masonry dam, the arch dam, the reinforced concrete dam and the rock fill dam. Many dams of all these different types have been built all over the United States. Probably the most common types are the earthen dam and the masonry dam.

From the dam to the power-house there will be a conduit. The character of the conduit will depend, as in the case of the dam, upon the particular conditions existing at the proposed power development site. If the head or fall available is very low, only a very short open flume will be necessary. If the head is a moderate height, or particularly if the head is high, it will be practically necessary to build a pressure conduit, though it is possible in some places to use an open canal. A pressure conduit may be either a tunnel, a steel pipe, wood stave pipe with steel bands, or a reinforced concrete pipe.

The Power-House

At the end of the conduit are located the hydraulic turbines. There are two types of turbines in use to-day—the reaction turbine and the impulse wheel. The reaction turbine acts entirely under the pressure of the water. This type is used under low and moderate heads, and in recent years has been used for relatively high head installations. The other type, the impulse wheel, is used principally under high heads. It consists of a wheel with cup-shaped buckets on the rim, on which water from a nozzle strikes, turning the wheel around. In the same building and connected to the water-wheels will be the electrical generators. In all modern installations these generators are directly connected to the hydraulic turbines; that is, the shaft which turns the generator is connected with the shaft of the water-wheel. Therefore the generator runs at the same speed as the water-wheel or turbine.

If the water-power is at some distance from the place where the electricity is to be used it will be necessary to increase the voltage so that it may be transmitted over high-tension transmission lines to the place where it will be used. In this case transformers are necessary.

Once those interested are satisfied that it is possible to develop water-power at a certain site, the very first step is to determine how much power can be economically developed and what the cost of the development will be. When an engineer is secured to determine these important matters he should be asked to state definitely in his report, first, the approximate amount of head that is available for power purposes; second, the amount of water which flows in the stream under average conditions and under extreme low conditions, with reasons for such estimates; third, the amount of power that can be developed under average conditions and under extreme low-water condi-

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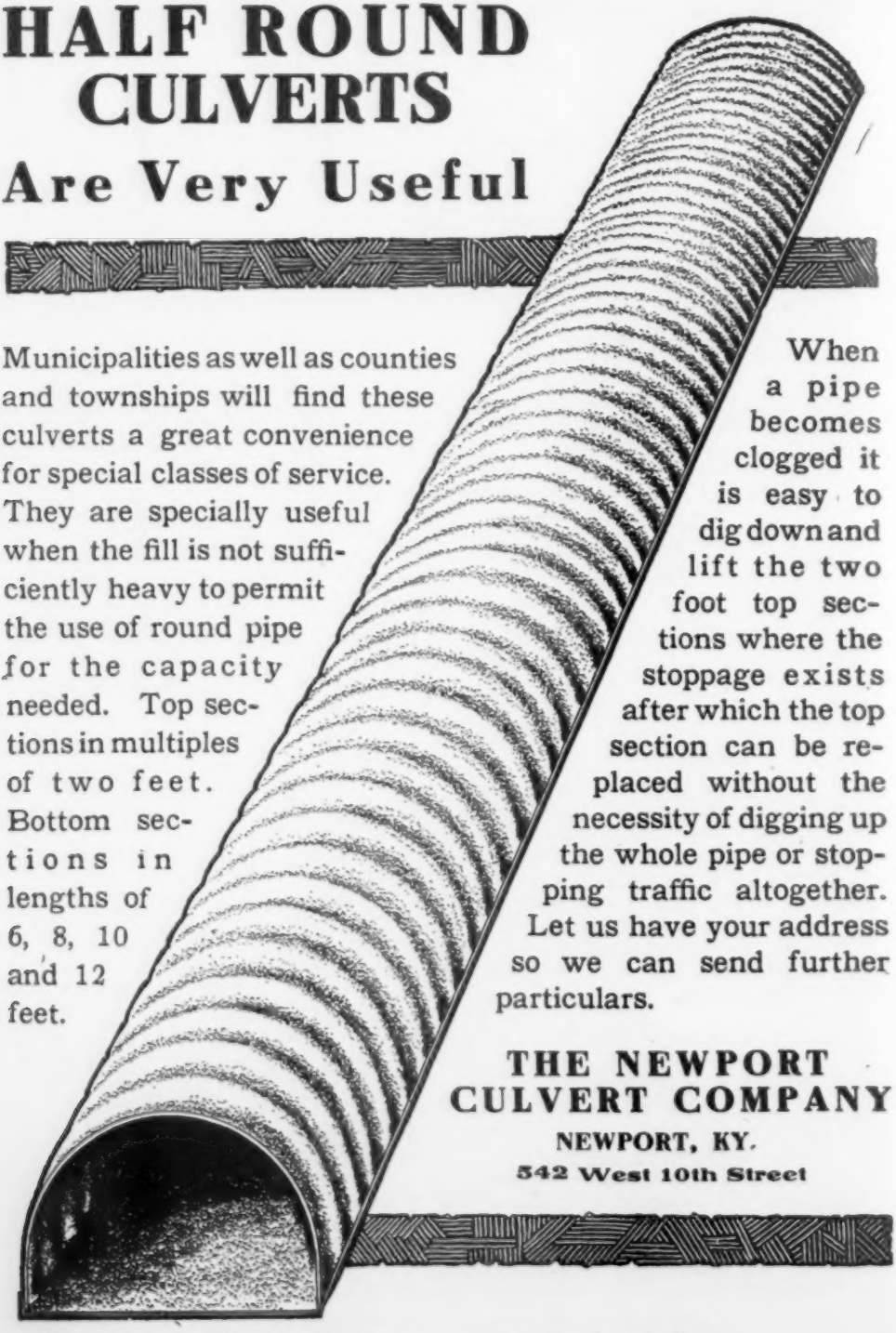

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tions; fourth, the cost of developing the power and transmitting it.

The two factors, the amount of power that can be developed, and the cost of developing the power, are the most important considerations in any proposed hydroelectric power development. It would seem as though this were self-evident, yet the failure to estimate reliably the amount of power that can be developed at a certain power site and what it would cost to develop it has resulted in many bitter disappointments. The first disappointment may come after the work is under construction. It may cost 50 per cent or 100 per cent more than was originally estimated. After the plant is in operation it may furnish sufficient power during the first year, and possibly for four or five years; then there may come a low year in which it is possible to develop only half of the amount of power for which the plant has been built. As a result, the water-power company or the municipality may be unable to supply its needs and may have to build a steam plant to take care of low-water conditions.

While there may be stream-flow records and records of rainfall, it is by no means a simple matter to determine how much power can be developed under average conditions and under extreme low conditions. The amount of power that can be developed can only be reliably estimated by a man expert in such matters.

It may be of interest to speak briefly of the two factors which must be considered in estimating the amount of power that can be developed on a stream. The first question to be considered is the head or fall that is available. By this is meant the difference in the level between the water back of the dam and the level of the water as it leaves the power-house. The amount of head is the natural fall in the stream between the dam and the power-house plus the height of the dam. If the amount of water flowing in a stream is constant, the amount of power that can be developed will vary in direct proportion to the head. That is, with a head of 200 feet twice as much power could be developed as with a head of 100 feet.

Having determined the amount of head available, the next step is to determine the amount of water that is flowing in the stream under average conditions and under low-water conditions. The United States Geological Survey, in coöperation with the different state departments, has made measurements of streams all over the United States. While it has not measured every stream, most of the principal streams have been measured. These measurements vary in duration, some being for a period of a year, some for five years, some ten years, and very rarely twenty or thirty years. In most localities a record will not be available for more than five or ten years. Assuming that there is a record of five years in length, it will be necessary to compare this record of stream flow with the records of rainfall in the vicinity. Such records of stream flow are almost certain not to show the lowest water conditions that may occur, for there may be at some future time a year in which the flow of the stream will be much less than that shown in the record of five years' length. In case no records of stream flow are available, it will be necessary to estimate the flow of the stream based upon the records of adjacent streams. It is advisable to install immediately a gaging station on the stream as near as possible to the site of the proposed development. In connection with an investigation that the writer is making at the present time for a hydroelectric power plant, he has had a stream-gaging station established and also four rain-gages placed on the watershed, and this is for only a small stream, though the head is high.

After it has been decided how much power can be developed under average and extreme conditions of stream flow, an estimate of cost should be prepared by the engineer. The estimate should be prepared in such a way that it will be absolutely certain that the cost of the work will be less than the estimate.

When the engineer's report is once in the hands of those contemplating the development of the power, a decision must be made as to whether to proceed with the work. Once it has been decided to go ahead, the work will be carried out in the same manner as any other piece of modern construction work.

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The City Budget at a Glance

Two Methods of Presenting Financial Results

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Fort Thomas, Ky.

Two methods of presenting municipal financial facts in an understandable and popular fashion are illustrated on pages 301 and 303. Fort Thomas, Ky., has prepared two budgets, one for the city at large and one for the school. As will be noted, a circle graph has been prepared showing the relative amount of money spent for each of the major items, and subdivided into the various purposes for which the money was spent. The graph serves not only to supplement the financial statement, which might be passed over by many readers, but also to give an idea of the relative amount of money spent for the different purposes, in a much clearer fashion than is possible by merely listing the sums of money. The circle graph would be more effective if the percentage or amount of money spent for each purpose were designated near the item.

A better way, perhaps, of presenting information of this sort would be by the use of a bar chart, which allows of a more ready presentation and comparison of the different items involved and overcomes the difficulty of placing the names and amounts in the different subdivisions of the circle graph.

Watertown, N. Y.

Watertown, N. Y., has presented its 1921 budget in the form of a tabulated chart, which contains detailed information without excessive detail. While this chart does not catch the eye as readily as the graphic forms, it nevertheless offers a very satisfactory presentation to the interested taxpayer. The amounts spent for particular items, such as salaries, office expenses or new equipment, may be readily compared, since they are all in one column. The total amount spent for each activity is obtained from the two right-hand columns, while the total for each classification is given along the bottom.

The chart would be improved by the addition of two columns to the right, the one containing the grand total of the cost of each account, equaling the sum of the totals by receipts and by taxation, and the other a series of grand totals, giving the budget allowances for whole departments, such as general government, protection, health, etc. The ordinary citizen will be most interested, perhaps, in the list of accounts at the left, as they reveal the wide range of activities of the city government in a way which he may never have realized. These 5 by 8 charts are printed on the back of every tax bill, in the *Watertown Monthly Municipal Bulletin*, in the annual city report, and in the daily newspapers. They also serve as a sailing chart to the head of each municipal department, so that he may know exactly what may be spent for each classification in his various divisions.

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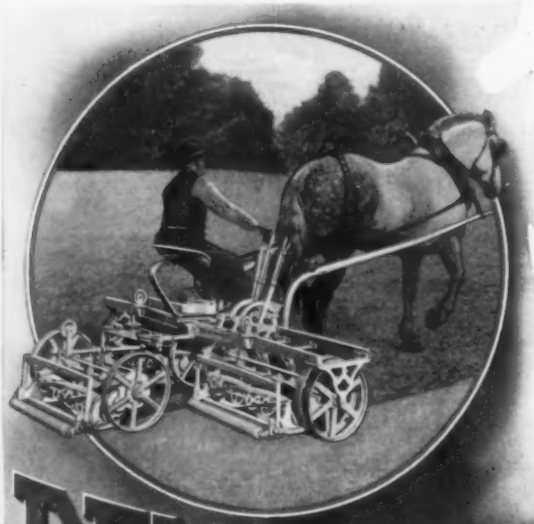

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Street Lights	3,725.00
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Fire-Police Department	1,175.00
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Five Years' Insurance	1,500.00
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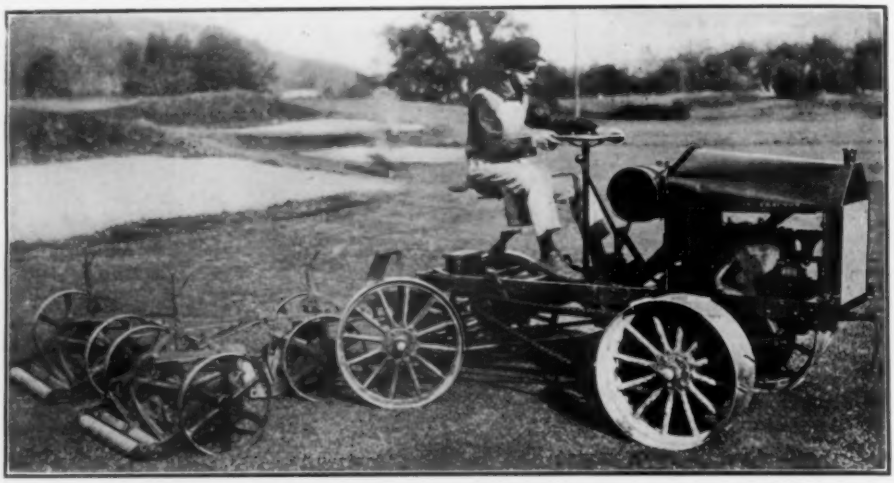
New Addition to Central School	3,683.75
Sinking Fund	5,000.00
	$58,893.75
Received from State	6,393.75
Received from City	52,500.00

ISSUED BY THE CITY COUNCIL

Reprinted by courtesy of Mayor W. H. D. Wheat



THE WORTHINGTON TRACTOR AND SHAWNEE MOWER

The Shawnee Triple Mower has become the main dependence for parks, golf fairways and lawns of large estates throughout the country.

It is drawn easily by one horse.

In combination with the Worthington Tractor it will mow four times as much lawn area as any other mowing apparatus in the world.

The Tractor is especially designed for lawn service. It improves the turf and does not mar or injure the surface. It has patented features which have given it immediate preeminence.

It displaces the horse and reduces the cost of the mowing operation one-half.

The gang mower alone and in combination with a tractor is broadly covered by patents owned by this company.

WORTHINGTON MOWER COMPANY

Shawnee-on-Delaware, Pa.

CITY OF WATERTOWN
BUDGET FOR 1921

In accordance with schedule of State Controller, for uniform system of accounts in cities of New York State

	NO	ACCOUNTS	SALARIES	CLERKS	WAGES	TRAVELING EXPENSES	OFFICE EXPENSES	PRINTING AND ADV.	NEW EQUIPMENT	MAINTENANCE OF EQUIPMENT	MATERIALS AND SUPPLIES	REPAIRS	LIGHT, HEAT AND POWER	RENT	INSURANCE	OTHER EXPENSES	BY RECEIPTS	TOTALS
			A			B	C	D	E	F	G	H	I	J	K	M		
GENERAL GOVERNMENT	101	COUNCIL	3000			200		1500								300		5000
	102	MAYOR	750													300		1050
	103	CITY MANAGER	7500	600		200	200									100		8600
	106	PURCHG AGT	2000				50	50										2100
	107	CITY AUDITOR	2500	500			100	200		50						50		3400
	108	CITY TREASR	2400	1650			250	325		25								4650
	110	CITY CLERK	1650	500			100	50			50							2350
	111	ASSESSORS	3240	500			110	450								6000		10300
	112	CITY ATTORNEY	3000	300		200	66		234									3800
	113	CIVIL SERVICE	300				50	50										400
	114	PUBLIC WRKS	8420	1650			300									300		10670
	116	CITY ENG OFF	12764	600	1000		536		800	200	100					300		16300
	117	ELECTION	7700		105			50	400		125			820		25		9225
	118	CITY COURT	3100	1800			250	50										5200
	119	MUNICIPAL BLDG		900	1200		546			200	1800	2254	1000			100		8000
	120	CONSTABLE FEES	300															300
	121	COMPENSATION														2000		2000
PROTECTION	130	POLICE DEPT	40776			500	250	150	300	600	250	250				500		43576
	132	FIRE DEPT	70903			200	195		15604	5045	4885	3250	552			966		101600
	134	BLDG INSPCTR	2400		520		85	650								345		4000
	135	PLUMBNG EXAMINR	195					55										250
	136	PLUMBNG INSPCTR	1800				25	300								275		2400
	137	WEIGHTS AND MEASURES	1800				60				50					240		2150
HEALTH	150	HEALTH ADMINISTRATION	6600				120	90	100		35					1855		8800
	151	MILK AND MEAT INSPECTION	2700		80		30	20	500		45					425		3800
	152	SIDE A WEE HOSPITAL	2000			60	30		100		600	400	60			50		3300
	154	DENTAL DISPNSRY	1650		100						200		50					2000
	155	CHILD WELFARE														1000		1000
	156	CREMATORY	720				39				20					171		950
SANITATION	160	BUREAU SEWERS			2750				1800		2250							6800
	161	STREET CLEANING			23225						275							23500
	162	REFUSE AND GARBAGE	5600		1500													7100
HIGHWAYS	181	HIGHWAY REPAIR AND PAINTING			24000				6800		7000	9200	49000					96000
	182	SNOW AND ICE REMOVAL			5600						1400							7000
	184	SIDEWALKS	1500		750						750							3000
	185	STREET OILING			3750						11250							15000
CHARITIES & CORRECTION	190	SUPT CHARITIES	2250			120	80									50		2500
	191	OUTDOOR POOR RELIEF									13000							13000
	192	INSTITUTIONAL RELIEF														20000		20000
	196	PROB OFFICER	1000															1000
	197	BUREAU OF CHARITIES														500		500
EDUCATION	210	SCHOOLS	254390	2480	25400	1000	460	1600	10400		39200	25500	4000		2000	16800	*89800	256840
	218	LIBRARY	3880	1200	785		630			1955	1320		230					10000
RECREATION	230	CITY PARK	1800		6030		155		385	270	580	2130	540	110				12000
	231	PLAYGROUNDS	1900		200				300	200	300	300				100		3300
	232	SWIMMING POOLS	400		200					100								700
	233	BAND CONCERTS														500		500
	234	MEMORL DAY														400		400
	235	SKATING RINKS			500													500
	236	TOBOGGAN SLIDES								500								500
MISC	260	PUBLICITY & PUBL LIABILITY														1500		1500
	266	CITY BULLETIN						300										300
DEBT	270	REDEMPTION OF DEBT														14000		14000
	272	INTEREST ON FUNDED DEBT														48013		48013
	273	INTEREST ON TEMPORARY LOANS														3499		3499
	274	DEBT														127272		127272
WATER	300	WATER ADMIN	4500	3700	4060	500	200	450	100						150	200	14860	
	301	OPERATION	4500		2800		366	50	5750		200	645				6085	20396	
	303	PURIFICATION	3000		8378		181		60	150	23975	4000	5567			800	46111	
	304	PUMPING	2000		5656		131				1150	500	2193				11630	
	305	DISTRIBUTION			8492				4881	6850		780					21003	
	306	WATER DEBT														(23788)	23788	
TOTALS BY CLASSIFICATIONS			476888	16360	127081	2980	6595	6390	48514	16145	108104	92096	63192	9302	150	278809	227588	941895

Does not include State and County tax for 1921 not layed yet, but was 191887 in 1920 ★ As sub-divided, requested 293430 accpt net 383230

Does not include $60000 estimated general receipts

BOWSER
ESTABLISHED 1885

Gasoline and Oil Storage is Safe

The air-tight and all metal construction of Bowser oil and gasoline measuring pumps and tanks eliminates danger from fire and explosion.

Not once in 35 years has a Bowser caused a fire or explosion.

Write for our Illustrated Booklet No. A-00.

S. F. BOWSER & CO., Inc.

1300 Creighton Ave., Fort Wayne, Ind.

S. F. Bowser Co., Ltd., Toronto
S. F. Bowser & Co., of Dallas, Texas

Branch offices in principal cities of the world

A Financial Service For the Municipality

We are prepared to inform municipal officials regarding

1. Present cost of raising money
2. The most desirable method of financing

Our municipal department handles state, county and municipal bonds representing over thirty states in the union. Our experience and facilities are at the disposal of any municipality.

Correspondence Invited

A. B. Leach & Co., Inc.

Investment Securities

62 Cedar Street, New York

Chicago Philadelphia Boston Buffalo Minneapolis Baltimore Pittsburg Cleveland

If You

are contemplating the purchase of a TRANSIT why not make it a "KOLESCH,"—and *know* you will be satisfied?

Kolesch Surveying Instruments

are built to meet the especial needs of Municipal Engineers, **Transit No. 7710** shown is particularly well suited for road, street and sewer work.

Send for latest catalog

KOLESCH & CO., 138 Fulton St., New York

News and Ideas for Commercial and Civic Organizations

Memphis Claims Continuous Membership Solicitation Record

MEMPHIS, TENN.—The records for continuous membership work are believed to have been smashed in Memphis just before Christmas when the Membership Division of the Chamber of Commerce reported a total of 424 new members for the last quarter of 1920. Ninety-three of the recruits were reported for the last week of the quarter. This brought the entire membership up to 5,010.

The meeting during that last week marked the end of what might be called the experimental stage of the division's work, with its zone plan of continuous solicitation. In the fall the Chamber had a membership committee of 25, and the majority of the work of securing new members was done by personal solicitation on the part of the membership secretary. The Board of Directors decided to expand the committee into a division and increase its number to 200.

The division having been created, its executive committee proceeded to divide the city into twenty zones, with a team assigned to each zone. Each of the teams was headed by a chairman, who directed the work of his organization under the supervision of the division chairman and the executive committee.

The Chamber's officials are highly pleased with the work of the division during its experimental stage, and expect even greater things of it during this year.

It should be stated, however, that the Memphis Chamber of Commerce experienced its greatest proportionate expansion in 1916, when, as a result of the reorganization campaign conducted by the American City Bureau, the membership was increased from 1,350 to 2,673. The experience gained in this campaign and subsequent war drives was employed to advantage during the continuous solicitation period.

J. A. OSOINACH,
Assistant Secretary, Memphis Chamber of Commerce.

Dead Trees Given to Woodchoppers for Firewood

WATERBURY, CONN.—Waterbury has gotten rid of about 500 dead chestnut trees as the result of a recent activity of the Rotary Club, which conceived the idea of offering them to the citizens for firewood if they would chop them down and carry them away. The chestnut trees were struck by the blight which swept the country a few years ago, and began to die at a time when labor was scarce and therefore expensive. They had become eyesores to the members of the Rotary Club, and the present period of unemployment, with the scarcity of coal and money, seemed an especially appropriate time to have them removed. Even wood is costing $14 and $15 a cord.

The suggestion was made at one of the meetings of the Rotary Club that the trees be offered for fuel to those who wished to cut them down. Permission was to be obtained from the property owners and the trees assigned in a systematic manner to those who applied for them. Several hundred yellow cards measuring 10 by 14 inches were printed, reading:

> P E R M I S S I O N
> will be given to cut down this tree No. ..... for firewood. Only those trees marked with this card may be cut. Any one who desires this tree should write to
> ROTARY CLUB WOOD COMMITTEE,
> Waterbury, Conn.

Notices were then inserted in the newspapers telling those who desired trees to meet the committee at a certain hour. At the appointed time, the committeemen appeared, armed with yellow placards. Woodchoppers soon were swarming around the spot. From one to five trees were given to each applicant, who took his numbered cards and tacked them to the trees of his choice.

All sorts and conditions of people applied for the trees. Some had money for coal and could not get it; others had need for

The Best Way to Bind Roads and Prevent Dust

THE adhesive properties of Dow Calcium Chloride Flake are so well known as to require little explanation to state highway departments.

But there are road makers and park and cemetery superintendents not yet familiar with the effectiveness and economy of Calcium Chloride as a dust preventive and road binder.

Roads are destroyed by continual loss of material, pulled away by rapidly moving wheels or blown away as dust. Dow Calcium Chloride Flake holds these fine materials firmly bound to the road. The flake form permits easy distribution.

Dow Calcium Chloride Flake prevents dust because it is a natural absorbent, taking and holding sufficient moisture from the air to keep roads in moist, dustless condition.

The application of Dow Flake Calcium Chloride to gravel or macadam road or driveway is simple and inexpensive. It is pronounced by expert road makers as the most economical and efficient dust preventive on the market at the present time.

Write for full information today if connected with building or maintenance of gravel and macadam highways in country, city or park.

The background of this advertisement shows exact size and form of Dow Calcium Chloride Flake.

THE DOW CHEMICAL COMPANY
Midland, Mich.

TRADE DOW MARK

coal but no money. Some carried their trees home on their backs; others cut them in lengths and piled them in wheelbarrows; others hired wagons. In three months all the dead trees, which had formerly only cluttered up the city and spoiled the landscape, had been felled, and the community was benefited in many ways from the activity.

GEORGE W. GREENE,
Secretary, Waterbury Rotary Club.

FIRE PREVENTION EXHIBIT OF THE IRONWOOD, MICH., CHAMBER OF COMMERCE

Fire Insurance Rate Reduced

DALLAS, TEX.—The city of Dallas received a welcome New Year's present in the form of a reduction in the fire insurance key rate from 16 cents to 12 cents, which became effective on January 1. In order to secure this lower rate, however, a vigorous fire prevention campaign was conducted, as a result of which the city is now freer from fire hazards, which is the real cause for thanksgiving. Another factor which lessens the danger of conflagration is the complete motorization of the fire department, which took place last year.

The reduction in the fire insurance rate came after many months of effort on the part of the city administration, the Chamber of Commerce and other bodies. In the city of Dallas itself the new rate means a saving of 4 per cent on mercantile buildings and their contents, and in the suburb of Oak Cliff 7 per cent. Dallas now has the lowest fire insurance key rate of any of the larger cities of Texas.

Z. E. BLACK,
Director of Publicity, Chamber of Commerce & Manufacturers' Association.

Fire Prevention Campaign in Ironwood

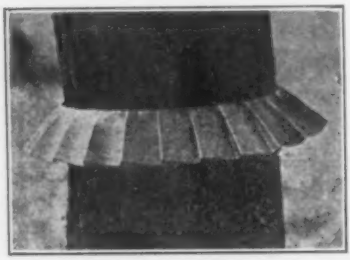
IRONWOOD, MICH.—As a part of the fire prevention campaign recently conducted in Ironwood, the exhibit illustrated herewith was held. It was very instructive, and aided greatly in driving home the lessons which the campaign was intended to teach. It taught, for instance, the proper use of the auxiliary boxes provided for hospitals and schools, as well as the use of hand fire extinguishers. Advice was also given on the right way to send in a fire alarm; 500 took advantage of the offer of such instruction. The auxiliary boxes and the fire alarm boxes used in the exhibit were furnished by the Gamewell Fire Alarm Telegraph Company.

Eight hundred cards containing the numbers and locations of the fire alarm boxes in the city were given out, also a large quantity of literature on the hazards created by electrical devices, and pamphlets on "Stop Burning Up Homes."

Talks on fire prevention were made in the schools, and fire drills were held in them. The results of the latter are most encouraging. Two weeks afterward a parochial school of 444 children, with no previous warning, left the building in 55 seconds after the alarm had been given, and were all back in their places, marching to the music of a piano, in less than five minutes altogether. The Central School children, over 900 in number, were out of the building in one minute and a half. The Lanfer School, with 823 children, were out in a minute and a quarter.

The good results of the campaign were made possible by the work of a joint committee of the city officials and the Chamber of Commerce, which coöperated with the Fire Chief in his desire to make it a signal success.

O. R. OXNAM,
Secretary-Manager, Ironwood Chamber of Commerce.



STANDARD TREE BANDS

PROTECTS TREES AND LARGE SHRUBBERY AGAINST ALL CLIMBING WORMS, CATERPILLARS, MOTHS AND INSECTS.

LASTS A SEASON—FULLY GUARANTEED.

Made of heavy waterproof paper, with a sticky material under the umbrella-like canopy. This canopy protects the "gum stickum" from the weather, as well as from dirt, dust and falling leaves.

No climbing caterpillar or insect can pass this sticky material. It catches them and holds them if they set foot upon it.

Attached to the band, on the inside, is a strip of fluffy felt. This felt fills up the depressions in the bark and prevents passage under the band. No cutting away of bark is necessary. The felt fills it up.

Guaranteed to be effective for the season, in all weathers and all temperatures in which worms or insects are active (about 40° Fahr. to highest summer heat).

Put up in rolls, 25 and 100 foot lengths, flat when boxed, mushrooms when tacked on tree.

Easily applied. Simply cut length to encircle tree. Tack, then raise the outer band until it stands out like an umbrella. It will mushroom as shown in cut and so remain. It only takes a moment.

Cheaper and better than the usual sticky materials applied direct to bark. Positively cannot injure tree. Bark colored and not unsightly. Can be taken down and discarded at end of season.

The most effective and practical method of banding trees yet devised—also the cheapest. Has the endorsement of foresters and fruit growers everywhere.

STANDARD FLOWER & GARDEN FERTILIZER

A powerful, highly concentrated and soluble plant food for flowers, house plants, shrubbery, trees, gardens, truck lands and lawns.

Promotes luxurious growth; increases the yield; imparts a deep green color to foliage and brilliancy to flowers.

The most highly concentrated and properly balanced fertilizer ever compounded.

Many times the strength of ordinary fertilizers. Never before has such a high analysis been attained.

A pinch will intensely fertilize a house plant, a one-pound package 200 square feet.

Standard Flower and Garden Fertilizer will revive those puny, pale, sickly plants, flowers, trees, shrubs, etc. A trial will convince.

ANALYSIS

Nitrogen	15 to 17 per cent
Equiv. Ammonia	18 to 20 per cent
Avail. Phos. Acid	10 to 12 per cent
Potash (K20)	8 to 10 per cent

Odorless

Put up in 1 and 5 lb. Boxes and 25 lb. Bags.

Extensively used in parks, cemeteries and public grounds.
Write for samples and prices.

THE EGGERT CHEMICAL CO., Canton, Ohio

AGENTS WANTED EVERYWHERE **WRITE FOR PROPOSITION**

Alexandria Hangs Out the Latch-string

ALEXANDRIA, LA.—Alexandria is flashing a warm welcome to visitors to the city by means of a huge electric sign which has been stretched across Jackson Street at the Union Depot. The sign, which is 30 feet long and 12 feet wide, carries the legend, "Alexandria, in the Heart of Louisiana," in letters two feet high. There is a heart in the sign which is four feet across and is illuminated with red incandescent globes.

The money for the sign, which was erected on December 1, was raised by the Chamber of Commerce by means of a street carnival in which none but local talent was used. The carnival was a great financial success.

To emphasize the welcome, a train shed is to be constructed over the passenger tracks at this depot, to make it possible for passengers to go from the depot to taxicabs in comfort when the weather is bad. When the depot was built, about ten years ago, through either oversight or lack of funds the Railway Company neglected to project a covering over the tracks from the depot proper, and the traveling public has experienced a great deal of inconvenience in getting on and off trains in inclement weather. Pressure was brought to bear upon the Texas and Pacific Railway, which owns the depot, by the Chamber of Commerce, with the result that the train shed has been included in the Railway's program of improvements for 1921, no money having been available for it in 1920.

A. T. FELT,
General Secretary, Alexandria Chamber of Commerce.

Merchants in Coöperative Advertising Campaign

BLUEFIELD, W. VA.—Coöperation among the merchants of Bluefield has been brought about in an interesting manner by the Chamber of Commerce, through its Merchants' Bureau. A year or more ago few of these merchants could be either cajoled or threatened into a coöperative frame of mind. They were sufficiently prosperous at that time, and were like the Irishman who said he could not fix his roof when the weather was bad, and when the weather was good it wasn't necessary. To-day, however, those merchants act and think as a unit. The change was not brought about by financial inclemency, either. Bluefield is still prosperous. The cementing force was an idea that appealed to the retailers, and one that worked splendidly.

Fifty of the retailers were induced to attend a supper meeting called by the Merchants' Bureau. At this meeting it was explained to them that Bluefield is the natural commercial center for a population of about 350,000 people living in adjacent counties of the great coal mining section of West Virginia; that most of these people are miners, or connected with the mining industry, and have more money than they know what to do with at present because of the large wages they have been receiving of late. The idea, the diners were told, was to create a channel through which this money would flow into Bluefield in exchange for the goods Bluefield merchants had to sell.

To accomplish that purpose a program of coöperative advertising was forthwith determined upon, and subscriptions to an advertising fund of $1,500 were called for. In thirty minutes $3,500 was contributed, and the following day the amount was increased to $5,000. "When that money is used up," they said, "just call again."

Thousands of letters were sent into the coal fields, and many pages of newspaper advertising were used to show the public that both better service and a better selection were obtainable in Bluefield than in the smaller mining centers. The dealers in the various specialty lines clubbed together in an effort to sell their commodities to the rural population. Local citizens were urged to trade at home; arguments were presented to them to show that they could do as well in Bluefield as elsewhere.

Monthly sales days, at which each merchant sold some article at absolute cost, were inaugurated. These sales days are now regarded as a public institution, and are anticipated with interest by both the merchants and the public. The streets are always lined with people, many of whom never traded in Bluefield before, but who now come from points 60 and 70 miles distant.

In order to ascertain the actual results of this activity, the Merchants' Bureau asked the banks for the amounts of the total deposits made by the merchants on the first of those days and the amounts deposited on the best day previously enjoyed by them. The comparison showed that the deposits on that day were twice as much as they had ever

THE OTTERSON AUTO-EDUCTOR
CLEANS CATCH BASINS
Saves Time—Money—Labor

Mounted on any 5-TON Chassis of suitable standard make.

THE OTTERSON AUTO-EDUCTOR CO. SPRINGFIELD, OHIO

Eureka Snow Plow

Horse Drawn Tractor Driven

Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

THE W. M. TOY COMPANY
Sidney Ohio

No matter WHAT drinking fountain you may put
INDOORS
← This
The MURDOCK
PATENTED
ANTI-FREEZING
BUBBLE-FONT

IS THE ONLY ONE THAT IS SAFE TO INSTAL **OUTDOORS** BECAUSE it is the only drinking fountain made that was designed and is built **solely** for outdoor use. It does not have to be turned off at the approach of cold weather.

THE ONLY FOUNTAIN MADE THAT IS STRONG ENOUGH TO WITHSTAND PUBLIC ABUSE.

Write for fully illustrated literature to
The MURDOCK MFG. & SUPPLY CO.
FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES
CINCINNATI, - - - - - OHIO
Builders of Water Service devices since 1853

been before. And the merchants declare that not more than 40 per cent of their business on those occasions is done on the special bargain that has been advertised, although it doubtless brings the crowd to the city.

These conspicuous results have shown the merchants the value of coöperative advertising, and they are now receptive to suggestions for coöperation along other lines.

CARROLL R. WOODS,
Secretary-Manager, Bluefield Chamber of Commerce.

Leavenworth's Auditorium and Sales Pavilion

LEAVENWORTH, KANS.—The farmers and stock breeders of Leavenworth County now have a fine large auditorium and sales pavilion in which their various interests may be taken care of. The Chamber of Commerce, with the Farm Bureau coöperating, organized the Leavenworth County Auditorium and Sales Pavilion Association to finance the enterprise. Approximately 25 per cent of the stock was taken by the farmers and stock breeders, and the balance by local business men.

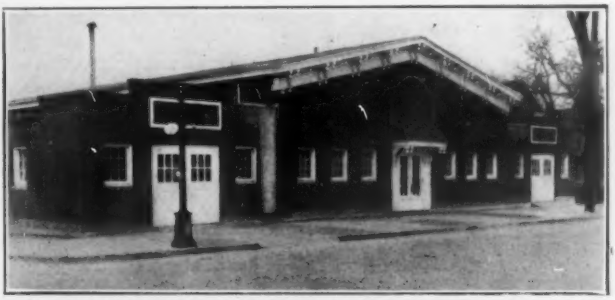
The building is a one-story structure, of truss roof construction, and measures 96 by 125 feet. It has a concrete floor 7 inches thick throughout. The walls are of hollow tile, plastered on the outside with Portland cement and stuccoed. There are four large double doors, and the main entrance is a smaller double door. The large doors accommodate a motor truck conveniently.

Besides the large auditorium, the building is equipped with offices, and rest rooms for men and women. At the time of submitting this article, three large public meetings had been held, also a county fair, a poultry show and a corn exhibit. There have also been held in the pavilion a pure-bred Holstein dairy cattle sale, a pure-bred Shorthorn beef cattle sale, two grade cattle sales, and a community sale, in which a considerable quantity of household goods and farm equipment was sold.

The project was undertaken with the idea of securing a combined convention hall and sales pavilion, and the building has met all expectations in that regard. The acoustic properties are excellent and the building is very comfortable for the holding of meetings. When used for exhibiting or sales purposes it will accommodate nearly 200 cattle at one time, and can be cleaned so easily and thoroughly that it is quite possible to follow a cattle sale with a public meeting.

The Association is managed by a board of seven directors, three of whom are farmers and live stock men and four are business men and bankers. The General Manager is President of the Leavenworth County Farm Bureau.

There has been the most complete harmony between the farmers' organizations and the Chamber of Commerce throughout the entire conduct of this undertaking. Leavenworth is the center of one of the richest agricultural districts in the country, in which general farming was the chief industry up to within the last three years. The efforts of the Farm Bureau, however, with the assistance of the Chamber of Commerce, have brought the county to the front as a dairy county, and the auditorium and sales pavilion was conceived of as a means of improving the condition of the stock breeders of the county.



AUDITORIUM AND SALES PAVILION PROVIDED FOR THE FARMERS BY THE LEAVENWORTH, KANS., CHAMBER OF COMMERCE

E. Y. BLUM,
Secretary-Manager, Leavenworth Chamber of Commerce.

Cleveland Votes Higher Taxes to Save Money

CLEVELAND, OHIO.—Selling higher taxes to a tax-weary city sounds anything but easy, yet the Cleveland Advertising Club

SPECIFICATIONS

Horsepower: 12 at drawbar, 20 at belt-pulley
Length: 96 inches
Width: 50 inches
Height: 52 inches
Weight: 3420 pounds
Turning Circle: 12 feet
Traction Surface: About 800 square inches
Center to Center of Tracks: 38 inches
Belt Pulley: Diameter 8 inches, face 6 inches

Cletrac
TANK-TYPE TRACTOR

Use Cletrac for Winter Road Work

THE all-purpose Cletrac is just as valuable on road work in winter as in summer. It works over icy footing and goes right through the deepest snow—keeps the roads clear with scraper or snow plow.

Cletrac has abundant power and that certain traction so essential in heavy winter hauling. Its broad, sharp-cleated tracks get a firm, *bull-dog* grip on all kinds of footing.

Cletrac is ruggedly built—it "stands the gaff" under the toughest of working conditions.

Investigate this tractor—then put it to work preventing winter traffic tie-ups in your town.

We'll gladly send you more detailed information. See the Cletrac dealer near you.

THE CLEVELAND TRACTOR CO.
"Largest Producers of Tank-Type Tractors in the World"
19205 Euclid Ave. **Cleveland, Ohio**

recently turned the trick. The story of how a special committee of the Club successfully conducted a campaign in behalf of five tax levy proposals contains suggestions which may save the day for organizations struggling with the tax problem. The five measures were carried by a vote of almost 3 to 1.

Cleveland was in financial straits, caused by steadily rising operating costs and a stationary income, and the city's tremendous growth of recent years, which, with the rigid Ohio tax laws limiting the tax to only one per cent of the assessed valuation of the realty, rendered it increasingly difficult for the city fathers to meet their obligations. The Board of Education had been limping along for some time with inadequate equipment, and faced the probability of being obliged to discharge 1,800 teachers within a year, and cutting down its curriculum considerably, unless the deficit were cared for. And there were appalling deficits in other departments of the city's work, especially fire; police; street cleaning, repairing and lighting; health; parks, playgrounds and public baths; the city hospital and infirmary, and the tuberculosis hospital.

The special committee appointed by the Cleveland Advertising Club made a careful study of the situation, and, with the assistance of the Bureau of Municipal Research of Cleveland, prepared 250,000 pamphlets containing facts and figures on every conceivable phase of the proposed five tax measures. It was pointed out in the pamphlet that unless the Clevelanders voted "yes" five times on election day, the city would not be safe, healthful, clean, prosperous, nor beautiful, and that it would lose half the educational service then rendered by the public schools.

Gardner Law Affords Relief

The case was not a hopeless one, however, because, to quote from the pamphlet:

"Fortunately the state legislature has realized the plight of Ohio cities and passed a relief measure. This is the 'Gardner Law.' It provides that interest and sinking fund charges on all city bonds issued before Jan. 20, 1920, may be met by a tax levy outside all existing tax limitations providing the people vote to do so.

"At present tax limits have been reached. The city cannot have a higher tax levy for operating purposes as things stand now. But if the voters place interest and sinking fund charges outside the present limit, leeway for securing additional revenue for operating purposes will be created within the existing tax limits.

"But to make the Gardner law effective as a relief measure, the voter must pass favorably upon two separate questions:

"1. To exempt the rate of 3.1 mills for interest and sinking fund charges from all existing tax limitations.

"2. To levy additional taxes for operating purposes of the city not to exceed 3.5 mills.

"The levy of 3.5 mills for operating purposes will not actually increase taxes. It will merely allow the city to secure additional revenue for operating purposes by taking advantage of the leeway within present tax limits created by exempting the interest and sinking rate from these limits.

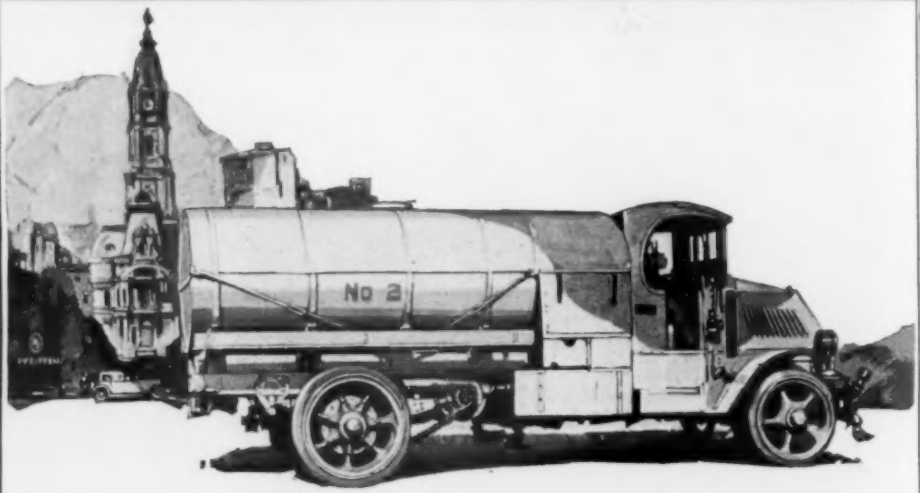
"The placing of the interest and sinking fund rate of 3.1 mills outside present tax limits does increase the total tax rate by that amount. But in the truest sense it will be a move to reduce taxes. This is true because it will make operation of the city on a pay-as-you-go plan possible. And this is the only sound policy to follow. To continue borrowing money for operating the government can only result in higher and higher taxes with less and less to show for them. The legitimate demands of Cleveland upon the taxpayers in future will be sufficient. Why increase them unnecessarily?"

Winning Over the Public

The pamphlet, which was called a "campaign primer," gave figures to prove that the measures proposed would cost only $5.05 more per $1,000 assessed valuation than the property owners were then paying, but would make possible the "pay-as-you-go" plan.

The story was also told in a series of 16 half-page and full-page advertisements which were run in 25 publications, including 13 foreign language newspapers. A one-reel motion picture, filmed especially for the campaign, entitled "Which Shall It Be?" was shown for twelve nights in picture theaters, schools, community centers and in the Public Square. Single and two-sheet "Save Cleveland" posters were put up in conspicuous places, and painted billboards carried the message to passers-by. Garbage wagons bore signs indicating that failure to vote "yes" on the five proposals on election day meant practical cessation of garbage collection.

Every public school was furnished with a banner for its entrance urging the public to keep the schools open. The children themselves helped out by drawing posters and staging demonstrations in behalf of "Save Our Schools."



The Two-Engine Mack Flusher

Both engines installed in the Mack two engine street flushing apparatus are designed and built by the same manufacturer—the International Motor Company. The service and economic advantage of this combination will be fully appreciated by those using the equipment.

As a result of the simplicity of Mack design, in both chassis and motors, and the high quality of materials and workmanship inherent in all Mack products, this particular two engine unit at lower final cost will give more service than other similar types.

The two-engine Mack flusher is especially adapted to high speed flushing, an important factor. Each engine has an abundance of reserve power and ample pressure is available for all requirements. Our engineering department will be glad to give further details concerning its advantages, specifications, etc.

INTERNATIONAL MOTOR COMPANY
New York

Mack TRUCKS

"PERFORMANCE COUNTS"

Special features abounded. A train of flat cars bearings signs urging support of the levies was run over Cleveland's street railway system for several days. "Mose" Cleveland, in tattered garb, stood at street corners distributing literature telling about his sad financial plight. Speakers were sent to address special meetings, and the cooperation of the pulpit was secured.

SHALL WE EDUCATE OUR GIRLS AND BOYS?
FOR YOUR OWN HEALTH, SAFETY and HONOR
VOTE YES 5 TIMES
SCHOOL TAX BALLOTS
DON'T LET THE SCHOOLS CLOSE UP
BE SURE YOU VOTE RIGHT!

TWO OF THE PLACARDED CARS THAT WERE RUN THROUGH CLEVELAND'S STREETS

The voting of these tax levies at a time when the community was already overburdened was a source of great satisfaction to the 23 club members delegated to see the proposition through.

DONALD C. DOUGHERTY,
In charge of Publicity, Cleveland Advertising Club.

"Resume Buying" Campaign Helps to Stabilize Business

KANKAKEE, ILL.—To keep business alive, a campaign to get the people to resume buying was conducted in Kankakee recently by the Chamber of Commerce. The Retail Merchants' Committee of the Chamber called a meeting of the Kankakee merchants for the purpose of discussing the situation which has arisen as a result of the buying strike, and determining upon a course of action. At this meeting the fact was clearly brought out that the farmers, the laboring men and the buying public in general were purchasing nothing that they could get along without because they were looking for still lower prices, not realizing that by continuing the strike on buying they had produced a condition which could be remedied only by a resumption of the practice of buying somewhat more than the actual necessities of life, and that their refraining from doing so was paralyzing industry.

As a result of this meeting, immense posters bearing the words "Buy What You Need Now," and "Your Purchases Keep Kankakee Industries Alive," were distributed simultaneously at all the stores and posted on billboards. The next morning the citizens were everywhere greeted by these significant appeals.

The newspapers carried advertisements covering an entire page setting forth the merchants' willingness to take their losses, along with everybody else, and their readiness to aid in bringing about normal conditions as soon as possible, but called attention to the fact that if the local industries were to be kept running, the men employed in them must keep on buying, and thus make it possible for the merchants to place orders with the industries; or, in other words, if the purchasing stopped, the merchant could not give any business to the jobber, nor the jobber to the industry. Without business, the industry would be obliged to close its doors and the workers would be thrown out of employment.

Several columns of these page advertisements were devoted to a comparison of the current prices of groceries, dry goods, shoes, etc., with those of several months ago. These comparisons showed a substantial reduction, and enabled the merchants to point out to the workers that their acceptance of lower wages made it possible for them to turn around and get a reduction in the cost of the things most essential to their existence.

Everyone feels that the campaign did much to enlighten the public mind in these matters and helped to eliminate misunderstandings.

E. A. WARNER,
Manager, Kankakee Chamber of Commerce.

Street and Road Building by Tractor
QUICKER—CHEAPER
Below is illustrated a Best Tracklayer "Thirty" hauling a road leveler. In putting through new streets and roads, in the maintenance of established highways, Best Tracklayer Tractors furnish the power needed to shove through the work without delays and at less cost than with animals.
Flexible, compact, easily managed, unaffected by heat, cold or long-continued stretches of work.
Many years of actual practical operation in territories notoriously severe on tractors has proven Best design, choice of materials and workmanship correct in every detail. Best is one of the pioneers in the tractor industry and Best Tractors have won a wide and enviable reputation on the big heavy duty work of the West and elsewhere.
Best Tracklayers are built in three models —Tracklayer "Sixty"—"Cruiser" (Sixty)— Tracklayer "Thirty." Write for catalogs, prices, specifications, name of nearest dealer.
C. L. BEST TRACTOR CO.
San Leandro California
BEST
TRACKLAYER
TRACTORS

Twin Cities Stage Novel Annual Meetings

Minneapolis Holds a Round-up

The annual meeting of the Minneapolis Civic and Commerce Association, held on November 8, was a decided innovation. Because of the inability to secure a dining-room large enough to accommodate more than 600 of its 5,500 members, the Association dispensed with the dinner and substituted a get-together meeting at the city auditorium, which, for the purposes of the evening, was called a "corral."

The meeting was styled the Annual Round-up, and the name surely typifies the spirit which prevailed throughout the evening. Nearly 3,000 of the Association's members came. It was necessary to abandon the usual follow-up of invitations, as the first notice brought in more than enough acceptances to fill the house. So large a gathering under one roof enabled the members to become better acquainted and to learn something of the fine spirit which underlies all the Association's activities.

The program started off with the singing of "Bubbles" by the audience, while several thousand inflated balloons were released from the balconies. And instead of the lengthy formal reports, the activities during the past year were portrayed in scenes acted out by various members. The only serious number on the program was the address delivered by Dr. James E. Freeman, in which he reviewed some of the Association's outstanding accomplishments during the past year, the policies pursued, and some of the things it hoped to achieve during the ensuing year.

The final number was an act in which those taking part, attired in regulation cowboy uniform, gave an imitation of a round-up, which amply justified the committee's promise of a "wild time."

The programs were made up in the form of a newspaper extra entitled *The Evening Whoop*, printed on both sides of a full-size pink-tinted newspaper page. Besides containing the extremely comical program, the paper was filled with fun and jokes, and made a great hit. Copies were distributed free at the auditorium by "newsies" brought from the down-town news stands, who called them out in the usual manner.

Saint Paul Buries "George"

The Saint Paul Association also abandoned its annual dinner this year because of the total inadequacy of the dining-halls to accommodate its large membership, and a desire to bring together at the annual meeting a greater proportion of the members. The meeting was therefore held in Saint Paul's great auditorium on January 11, and the Association invited the leading civic and commercial organizations to participate.

One of the special numbers on the program, contributed by the Business and Professional Men's Association, was an enlargement of the "Know your city" idea, showing the confusion that exists in people's minds regarding the twin cities and the ridiculous mistakes that are made in attributing to Minneapolis matters that relate to Saint Paul, and vice versa.

A real program of work for the Saint Paul Association was developed in a series of original "stunts" in which representatives of the city's nineteen civic and commercial organizations took part. For instance, the delegation from South Saint Paul, by means of a bottle, showed a street that was too narrow. A dummy trolley car placed on the stage illustrated the crowded conditions of the trolley cars due to the limited service. The Midway Club with a band and a small parade, illustrated the industrial advantages of the section from which they came.

The concluding number on the program was the burial of "George," and those who have been inclined to "let George do it" will find that their prop has been removed. A hearse drawn by two dilapidated horses was dragged across the stage, and "George" was laid to rest by the group of "town criers" in a scene indicating to the vast assemblage that "George," the faithful, had died of a broken back from his many years of service. The organizations working for the betterment of Saint Paul have made up their minds to get together in every sense of the word, and do the work themselves.

The affair developed into an immense vaudeville entertainment, with horses, live lions and goats on exhibition. At least 4,000 people were crowded into the auditorium, all "rooting" for Saint Paul.

The City Beautiful

is only possible by proper care of shade, ornamental trees and shrubbery.

Power spraying will do more towards beautiful parks and streets than other methods.

Spray with the **Bean Power Sprayers** and reduce the cost of maintenance.

Then use the same sprayer for whitewashing or coldwater painting your public buildings.

Write today for our latest catalog.

Bean Spray Pump Co.
26 Hosmer St.,
San Jose, Calif. Lansing, Mich.

HOLT
PEORIA-STOCKTON

"THE NATION'S ROAD MAKER"

State highway department records show that seventy-five per cent of the dust moved in road construction is handled with wheel scrapers.

Handling this work with teams is slow and expensive, but the "Caterpillar" Tractor, with its multiple speed transmission, speeds up the job. Its flexible roller frame construction gives positive traction and its independent clutch control permits shortest turning in narrow cuts or fills.

Contractors and road builders everywhere have found that with "Caterpillar" Tractors and wheel scrapers they can move more dirt per day, per month or per job, at a lower cost than by any other method.

Bulletin C-158, "The Nation's Road Maker," mailed on request.

The HOLT Manufacturing Co., Inc.
Peoria, Illinois

Spokane, Wash. New York Office, 50 Church St.
Factories at Stockton, Cal. and Peoria, Ill.

R-11

There is but one CATERPILLAR – HOLT builds it.

Municipal Activities

New York city has adopted an ordinance designed to stimulate construction of dwellings and to relieve the housing shortage under a permissive state law. This ordinance exempts from taxation for a period of ten years dwellings erected between April 1, 1920, and April 1, 1922, up to the sum of $5,000 for each separate family dwelling, whether a single-family house, a part of a two- or three-family house or an apartment, at the rate of $1,000 a room, up to five rooms. The period of exemption will run from the date of occupancy.

* * * *

The Community House of the Community Club of Wanaque, New Jersey, the gift of the Wanaque River Paper Company to the borough, has been formally opened. The cost of construction was about $40,000. On the first floor is a library, a canteen, and an auditorium with balconies, stage and two dressing-rooms. On the second floor there is a billiard room and a room for the local ladies' organizations. In the basement there are shower-baths and a kitchen, and later two bowling-alleys will be installed. The auditorium will seat about 500, and will be used for motion pictures, dances, entertainments and basket-ball.

* * * *

During the past year the total assessed valuation of the cities of the first class increased 19 per cent. The total assessed valuation of the school districts occupied by the cities of the first class increased 18 per cent. The average increase in tax rates for cities of the first class is 12 per cent. The average increase in the school levies of the respective school districts is 29 per cent. The approximate assessed per capita valuation of the cities of the first class is $1,217, while the same for the state of Kansas is $2,187.

The total assessed valuation of the cities of the second class increased 15 per cent. In the corresponding school districts the total assessed valuation increased 18 per cent. The average tax rates in the cities of the second class increased 12 per cent, while the average school tax levies for the corresponding districts increased 33 per cent.

(The above data were compiled by the Municipal Reference Bureau, Lawrence, Kans., from information obtained from 10 cities of the first class and 71 cities of the second class.)

* * * *

Johnstown, Pa., is considering the adoption of a city plan. To promote public interest in the subject, J. D. Ripple, Superintendent of Grammar Schools, introduced the study of the improvement plan into the English course some time ago. At the mid-year graduation exercises it formed the subject of the speeches given in the commencement program. Six boys and girls, chosen after competitive tests, each representing one of the graded schools, discussed with forcible arguments why the report of the city planning commission should be adopted.

The information for the papers and the stereopticon slides was supplied by the Secretary of the City Plan Commission, Leo J. Buetner, who also assisted in training the speakers. The result of the program was a marked increase in public enthusiasm for the opportunities of local city planning.

* * * *

Evanston, Ill., has been experimenting with the use of motion pictures in nature study in the public schools. The Black Swallowtail butterfly was studied from textbooks and actual specimens. The Monarch butterfly was studied by means of a film showing the life history of the insect. The question was then put to a vote of the children as to which of the two methods had been the more effective. The referendum showed 170 out of 180 in favor of the motion picture.

* * * *

William C. Barber, formerly Mayor of Joliet, Ill., has accepted the position of City Manager of Dayton, Ohio. His term of office began February 1. The salary will be $12,000 a year.

PACKARD

Bigger Yardage

Road builders have found that a Packard Truck, even when shouldering its way through the toughest going, can carry greater loads and more loads in a given time.

This ability to serve its owner profitably is a direct result of the tested design, selected materials and expert workmanship that enter into Packard manufacture, and of the method by which every Packard Truck is specified to its particular job.

Hart and Page, Chicago contractors, found that their Packard on a good-roads job carried greater pay loads and made from one to four more trips each day than other trucks in the same class of work.

Every Packard Truck has the benefit of the countrywide service facilities established to keep the Packard Truck at the highest possible level of efficiency.

PACKARD MOTOR CAR COMPANY · DETROIT

Ask the man who owns one

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Ordinance Which Forbids Street Parades and Public Assemblages Without a Permit by the Mayor, Upheld

A decision of the Court of Common Pleas for Allegheny County, Pa., announced in the case of Commonwealth vs. Danich, 12 Pennsylvania Municipal Law Reporter, 54, upholds the validity of an ordinance of the city of Duquesne, forbidding street parades and public assemblages without a permit issued on the mayor's being satisfied "that the same shall not be detrimental to the public interests." The reasoning of the Court is as follows:

"It is to be observed that the ordinance does not prohibit assemblages, public meetings, etc. On the contrary, it provides that the mayor shall issue a permit therefor, unless detrimental to public interests, and of that the city of Duquesne, acting through and by him, is the judge. It is not the cause of organized labor to which the mayor objects; it is the open discussion of such subject. He cannot refuse a permit because he does not approve of the subject, but the open discussion of the subject presents to him an entirely different question.

"This was an assemblage upon a public street. The avowed intention of the meeting was to publicly discuss a subject in a locality where in the past its discussion has been the cause of riots, bloodshed and death, a subject which at this time provokes great excitement, bitter feeling and inflamed passions among those who discuss it.

"The time of the meeting was fixed for a Sunday afternoon in May, at which time an unusually large number of idle and curious people are on the streets, ready and willing to be entertained by any attraction which might furnish them excitement, many of them no doubt deeply interested in the subject matter of the meetings, having divergent and pronounced feelings, opinions and convictions, and ready, willing and anxious to express them, and in the heat of the argument liable to overstep the bounds of mere verbal polemics.

"Is an ordinance which authorizes a municipality to forbid such a meeting within its limits an invasion of the rights of the people of such municipality? Does it not rather afford a protection to and a preservation of their rights? It is true that the mayor might have thrown a cordon of police around the meeting and permitted it to proceed, but the presence of police at such times is not always an assurance of peace, and if the mayor in his judgment thought that impractical or unsafe, and that the safer way was to forbid the meeting, how can his action, viewed in the broad sense, be an infraction of the rights of the people?"

Where in Letting of Contract Charter Provision is Violated, Contract Will Not Support Claim for Reasonable Value

Where a charter forbids purchases of supplies, appliances, etc., by a municipality without competitive bidding, where the amount involved exceeds a certain sum, the provision cannot be evaded by splitting up into several purchases what is in reality a single purchase (e. g., a fire and police alarm system). And where the provision is violated, the contract is utterly void; it will not support a claim by the contracting party for the reasonable value of the supplies, appliances or other things furnished the municipality under the contract. (California District Court of Appeal, Gamewell Fire Alarm Telegraph Co. vs. City of Los Angeles, 187 Pacific Reporter, 163.)

City's Duty as to Condition of Streets Does Not Extend to Uncontrollable Travel

The obligation of a municipality to keep its public ways in a reasonably safe condition for public travel applies to such persons as travel the ways in the usual modes, and does not extend to undirected and uncontrollable travel, such as a team of horses running away in the absence of its driver. The municipality is not responsible for injury sustained by a person upon the vehicle involved in such runaway, if it results from the uncontrolled action of the team in leaving that part of the public way which is reasonably adequate and safe to travel. (Ohio Supreme Court, Drake vs. City of East Cleveland, 127 Northeastern Reporter, 469.)

TIFFIN Flushers

Because of their TWO-MOTOR-SYSTEM design and because of their inherent sturdiness of construction, Tiffin Flushers will do more work and better work at less expense; are easier to control; and have the further advantage of being convertible for commercial hauling.

Do You Want Street Flushing Facts?

We have issued information regarding the cost and range of street flushing apparatus that is very valuable to city engineers and purchasing agents whether or not they are interested in flushing apparatus of Tiffin type.

We are selfish in wanting you to have this data that is VALUABLE TO YOU, because you are likely to see that no other apparatus gets the results quite so effectively as TIFFIN APPARATUS. Send for this literature today.

The TIFFIN WAGON Company
TIFFIN, OHIO
Representatives in Principal Cities

Makers, also, of Tiffin Motor Trucks, Dump Wagons and other Municipal Vehicles.

Ordinance Requiring Vehicles to Stop at Rear of Street Cars Discharging or Receiving Passengers, Upheld

The Ohio Supreme Court upholds an ordinance of the city of Cleveland, requiring vehicles moving in the same direction as street cars to stop at the rear while such cars are discharging or receiving passengers, excepting that in congested districts vehicles may pass by clearing the lower step of the street car by at least six feet. (128 Northwestern Reporter, 164.) The Court says:

"The provisions of this ordinance constitute a reasonable and proper police regulation to control traffic and protect pedestrians. It is not invalidated, as claimed, because it does not specify or require to be marked or designated the places where street cars may receive and discharge passengers; nor by reason of the requirement that such vehicle must remain standing until the street car resumes motion. The enforcement of the requirements of the ordinance will not constitute an unreasonable and unconstitutional interference with the liberty and rights of any citizen, nor deprive any citizen of equal protection and benefit of the law."

In the Absence of Constitutional Limitation, Legislature Has Power by Statute to Impose Obligation on Municipality

Upholding the right of a treasurer of the city of Richmond to recover compensation against the city under a state law requiring cities to pay certain commissions on tax collections, the Virginia Supreme Court of Appeals says in the case of Pace vs. City of Richmond, 103 Southeastern Reporter, 647:

"Authorities are cited to the effect that it is beyond the power of the General Assembly to require a municipal corporation to pay any official a bonus. The validity of these authorities may be conceded, but they are not relevant in this connection. . . .

"However much the Segregation Act may have increased the work of the plaintiff, his duties and responsibilities as treasurer of the city of Richmond, he was not entitled merely on that account to sue the city . . . for additional compensation. But it was competent for the General Assembly, in view of the effect of its statute upon the responsibilities and work of that official, in his city or local capacity, to require the city to increase his compensation. The authority of the act, and not his increase of duties and responsibilities, or his loss of compensation, afforded his right to sue the city. . . . The increase of compensation which it provides is in no sense a bonus.

". . . If there is no special limitation in the constitution, and the debt or liability is one to be incurred in the discharge of a public or state duty which it is proper for the Legislature to impose upon the municipality, it can constitute no objection to the validity of the act that the debt or liability is to be created without its consent. The Legislature may direct a municipal corporation to build a navigable watercourse within its limits, or the state may appoint agents of its own to build it, and empower them to create a loan to pay for the structure, payable by the corporation.

"The fact that a claim against a municipal or public corporation is not such a one as the law recognizes as a legal obligation has often been decided by courts of the highest respectability and learning to form no constitutional objection to the validity of a law imposing a tax and directing its payment.

"The Legislature has the power to levy a tax upon the taxable property of a town and appropriate the same to the payment of a claim made by an individual against the town. It can direct the proper authorities of a town to assess a tax, cause the same to be collected, and apply it to discharge of such a claim, even though the claim has been rejected by the voters of the town, and though the claim is not recoverable by action against the town."

Ordinance Prohibiting Construction of Ceiling and Partition Walls of Dwellings Unless Composed of Certain Materials, Held Void

The Illinois Supreme Court has annulled an ordinance of the city of Chicago, which purported to prohibit construction of ceilings and partition walls in buildings of ordinary construction, unless composed of lath and plaster of a combined thickness of at least 7/8 of an inch. (McCray vs. City of Chicago, 126 Northeastern Reporter, 557.) It is held that the ordinance is void as being unjust and unreasonable in its discrimination as to the material to be used for the partitions and ceilings of the rooms in ordinary dwelling-houses. But the Court conceded:

"That an ordinance is not discriminatory where it operates on all persons engaged in the same business or calling alike, and where there is no other calling or business in precisely the same position"; "that an ordinance that fairly tends to serve and promote the public health or safety is reasonable"; "that any one attacking an ordinance because unreasonable must show affirmatively wherein the ordinance is unreasonable"; "that courts will not disturb an ordinance of the character here in question when there is room for a difference of opinion as to whether or not the public safety will be promoted by the provisions of the ordinance"; and "that on a question whether or not a particular thing may or may not be detrimental to public safety, the determination by the legislative body, if it has not acted unfairly or arbitrarily, will be held conclusive."

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For What Kind of Service?

What Kettle Capacity?

Order Now--Avoid Delays

You Can't Go Wrong on LITTLEFORD Tar and Asphalt Heaters

MANUFACTURERS OF

Asphalt Heaters
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Tool Heaters
Tar Kettles

also

Tanks and special plate steel work to order.

What did winter do to your streets and roads? Now is the time to prepare for spring operations and for the early repair of the damage by freezing.

You may need additional heaters. Study your requirements and place your orders as early as possible so as to insure prompt delivery.

We will be pleased to send you complete information on request. **Write now—a post card will do.**

LITTLEFORD BROS.

500 E. PEARL ST.
CINCINNATI, OHIO

When writing to Advertisers please mention THE AMERICAN CITY.

Decision Holding Invalid an Ordinance Regulating the Use of Snow Sweepers by Street Railway Company

Is it within the power of a municipality to require a street railway company operating within its limits to refrain from using a snow-sweeper or snow-plow in such way as to pile snow along street sides?

This question is answered in the negative by the Court of Common Pleas for Luzerne County, Pa., in the case of W. B. R. R. Co. vs. Sugar Notch Borough, 12 Pennsylvania Municipal Law Reporter, 36. Although the decision is not one of a court of last resort, it is of importance because relating to a question upon which it seems that the law is not well settled by appellate court precedents.

It seems that the ordinance was so worded as to require the plaintiff street railway company to remove from the borough all snow removed from its tracks. The Court holds that this ordinance was not justified by charter power in the borough to regulate streets, etc., and to prohibit obstructions or nuisance therein. In reaching this conclusion, the Court says:

"No abutting property owner had the specific right to have this ice and snow removed in the manner provided in this ordinance. The rights of abutting property owners, like the rights of all persons entitled to travel up and down the highway, are to have the use of the highway regulated under the supervision of the municipality through the adoption and enforcement of reasonable ordinances.

"The defendant is charged with the duty of removing obstructions from the street and keeping the street in a reasonably safe condition for public travel, and it was in the performance of this duty that the borough officials have attempted to regulate the use of electric snow-sweepers, which pile up the snow upon both sides of the tracks and prevent the use, either by abutting owners or by the general public, of any other part of the street for the purpose of passage or across to their own premises. But if we are correct in the main conclusion of law at which we have arrived, then the attempt by this borough was not a reasonable exercise of its authority.

"The plaintiff company, by reason of its right to operate a single-track railway on Main Street, in the defendant borough, has also the right to such incidental use of the land within the street immediately adjoining the railway as is consistent with the reasonable use of the street by the general traveling public, and as is incidentally necessary to enable the plaintiff to operate its railway.

"The said railway company in removing snow from its tracks must act with due regard to the right of travelers upon the highways and so as not to interfere, needlessly, in a practical sense, with the safety and convenience of persons lawfully using the street in an ordinary way.

"If as an incident to the operation of its rights under the franchise ordinance of August 24, 1892, it becomes necessary to remove snow and ice from its tracks, the plaintiff may do so, provided that thereby it does not unreasonably interfere with other public travel upon the said street.

"We do not decide that conditions may not arise under which removal of snow in some particular way might not become a public nuisance. We decide only that by removal of snow, as shown to have been done in this instance, there has not arisen a per se public nuisance, but that the inconvenience suffered by the public upon the street was a necessary incident of weather and seasonal conditions, which imposed various disadvantages that must be proportionately borne by all who lawfully travel upon the street, until by a reasonable exercise of municipal power these disadvantages are otherwise provided for."

Act of Arkansas Legislature That City Manager Need Not Be Resident of City, Held Unconstitutional

A city manager is an "officer" within the meaning of the provision in the Arkansas constitution that no person shall be elected or appointed to an office who does not possess the qualifications of an elector. Hence, the act passed by the Arkansas Legislature in 1917 is invalid in so far as it provides that city managers need not be residents of the cities whose affairs they are chosen to manage. (Arkansas Supreme Court, McClendon vs. Board of Health of City of Hot Springs, 216 Southwestern Reporter, 289.)

On the Calendar of Conventions

APRIL 27-29.—HOUSTON, TEX.
American Society of Civil Engineers. Annual convention. Secretary, Charles W. Hunt, 33 West 39th Street, New York, N. Y.

APRIL 27-29.—ATLANTIC CITY, N. J.
Chamber of Commerce of the United States of America. Annual meeting. Secretary, D. A. Skinner, Riggs Building, Washington, D. C.

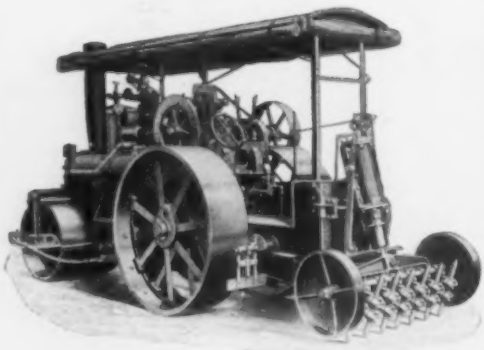
APRIL 28-29.—ATLANTIC CITY, N. J.
New Jersey Mosquito Extermination Association. Annual meeting. Secretary, Thomas J. Headlee, New Brunswick, N. J.

MAY 9-11.—BUFFALO, N. Y.
American Association of Engineers. Annual convention. Secretary, C. E. Drayer, 63 East Adams Street, Chicago, Ill.

MAY 11-14.—JACKSONVILLE, FLA.
Southern Commercial Secretaries' Association. Annual convention. Secretary, G. T. Cross, Monroe, La.

FOR ALL ROAD WORK

A Complete Line of Equipment Proved by Years of Experience

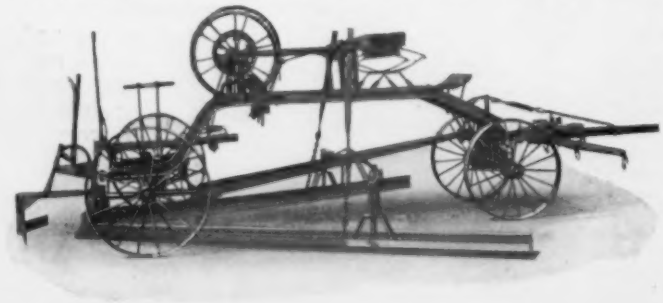


The wide-spread use and endorsement of Austin-Western equipment by leading contractors and municipalities is due to one thing —**the years of proved ability back of every machine we build.**

For road making and road keeping—for all road work—there is an Austin-Western QUALITY-BUILT machine.

From the cutting of the subgrade—the first big difficulty on any road job—to the finished road and its maintenance, there is an Austin-Western machine specially designed and built for each task.

You'll find in the Austin-Western catalogs the answers to your road problems. Ask for those covering the specific equipment which interests you. Sent gladly on request.



The Austin-Western Road Machinery Co., Chicago

New York	Columbus	Nashville	Pittsburgh	San Francisco
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51 Chambers St., New York, U.S.A. Cables: Almacoa, New York

Municipal and Civic Publications

THE PRACTICE OF SILVICULTURE—WITH PARTICULAR REFERENCE TO ITS APPLICATION IN THE UNITED STATES

Ralph C. Hawley, Professor of Forestry, Yale University. John Wiley & Sons, Inc., New York. 1921. xi + 352 pp. Diagrams and tables.

A practical text-book on the methods of handling forests, for the use of those engaged in developing commercial or municipal forests in the United States. This book covers a field previously unfilled and should prove invaluable to the many officials throughout this country who desire to establish forest tracts for commercial purposes or for the benefit of municipalities. It contains a complete discussion of the methods of reproduction of forests, outlining the treatments of the tract during the period of regeneration or of establishment. The clear-cutting method, the seed-tree method, the shelter-wood method, the selection method, and the coppice method of regeneration are described in detail, with diagrams to help the forester to choose the proper method for his particular tract. The proper manner of cutting, methods of slash disposal, protection against forest fires, insects and tree diseases, as well as the various effects of animal grazing in a forest tract, are admirably discussed. This is a book which will be sought by municipal officials in growing numbers with the increasing appreciation of the value of municipal forests.

HOUSING PROBLEMS IN AMERICA

Proceedings of the Eighth National Conference on Housing, at Bridgeport, December, 1920. Published by the National Housing Association. ix + 386 pp.

Contains the complete papers presented at the conference, together with the discussions. There are the reports from the delegates, the report of the Secretary, and lists of delegates and directors. Among the subjects considered were: "Exemption from Taxation and Other Subsidies"; "Investing in Real Estate Mortgages"; "Coöperative Housing"; "Unwise Building Laws"; "Housing in France"; "What is a Fair Rent?"; "English Garden Communities." This is by no means a complete list, but it illustrates the wide variety of topics considered.

THE TWENTIETH CENTURY RURAL SCHOOL

E. E. Davis, M.A., Rural Life Specialist, University of Texas. Bobbs-Merrill Company, Indianapolis. 1920. 242 pp.

This volume has been prepared for county school superintendents, members of county boards of education, rural school and village teachers, the rural school sections of teachers' institutes, and for classes in rural education in state normal schools. It has been prepared from the viewpoint of the country teacher facing actual conditions at close range, rather than from the viewpoint of the college man interpreting rural data at long distance.

NOTES ON IRRIGATION, ROADS AND BUILDINGS AND ON THE WATER SUPPLY OF TOWNS

William Lumisden Strange, E. P. Dutton & Company, New York. 1920. xxiii + 849 pp. Diagrams and tables.

A collection of notes made by a prominent English engineer on the subjects outlined in the title. Under Irrigation, the subjects of rainfall, river discharge and supply, large reservoirs, masonry dams, earthen dams, weirs, canals, embankments, silt, regulation, distribution, law, finance and administration are covered. Under the subject Water Supply of Towns, the following subjects are taken up: pumping and distribution, supply works, water-borne diseases, etc. Under District Roads, all phases of road design and construction are discussed in detail.

CONCRETE WORK—VOLUME I

William Kendrick Hatt, Professor of Civil Engineering, Purdue University, and Walter C. Voss, Department of Architectural Construction, Wentworth Institute, Boston, Mass. John Wiley & Sons, Inc., New York. 1921. xix + 451 pp. Diagrams, illustrations and tables.

A book particularly adapted to industrial schools, to aid the self-development of workers in concrete, and for students in engineering. The text contains discussions of plans, details and specifications, shows the layout of different types of footings, concrete walls, the erection of reinforcing for concrete, the manufacture of pre-cast stone, the building of walls and partitions, the laying of concrete walks and pavings, methods of building finish, special concrete construction, and a closing chapter on estimating.

JOT—THE QUICK-WRITING SYSTEM

Milton Wend, Tribune Building, New York City. 24 pp.

A compact, well-written instruction manual, describing a new system for quick writing to conserve the time and energy of busy people. It is not a system of shorthand, but uses the characters of the alphabet in a logical, scientific manner for the rapid recording of notes. An excellent volume for city clerks, clerks of committees, chamber of commerce secretaries and other executives who must take notes hurriedly at meetings.

DEMOCRACY AND ASSIMILATION

Julius Drachsler, Assistant Professor of Economics and Sociology in Smith College. The Macmillan Company, New York. 1920. 275 pp.

Dr. Drachsler analyses some of the basic facts of the problems of immigration and assimilation, with a particularly detailed discussion of intermarriage, and the resultant effects on American life. The effects of the war on the "melting pot," and the subject of Americanization, are taken up at length. The statistical tables in the appendices, especially those covering vital intermarriage in the racial groups of New York City, will be interesting to sociologists.

The publications listed above are for sale by their publishers. Those listed below are understood to be free upon application.

INDUSTRIAL HOUSING

"Industrial Housing," by Clinton Mackenzie. The Knickerbocker Press, New York City. 71 pp. Illustrated. 1920. The author has been Tenement House Commissioner in New Jersey, and a Director of the National Housing Association. The book describes in detail such housing developments as those in Kingsport, Tenn., Milton, Pa., and elsewhere. (Apply to the author, at 15 Broad Street, New York, N. Y.)

COMMUNITY BUILDINGS

"Plans of Rural Community Buildings." By W. C. Nason, Assistant in Rural Organization, under the direction of C. J. Galpin, Economist. Published by the United States Department of Agriculture as Farmers' Bulletin 1173. 38 pp. Illustrated. 1921. Pictures, plans and descriptions, with costs of various types of community buildings suitable for villages. (Apply to W. C. Nason, Assistant in Rural Organization, United States Department of Agriculture, Washington, D. C.)

SERVICE AT COST

"Danger Points in Service-at-Cost Plans," by Delos F. Wilcox, Ph.D. Published as Leaflet No. 2, Public Utilities for Public Service. 1921. An account of the workings of the Service-at-Cost plan in Cleveland, and an analysis of the principal dangers in the scheme, which should be avoided by cities considering its adoption. (Apply to Delos F. Wilcox, Ph.D., 73 Gleane Street, Elmhurst, L. I.)

FORESTRY

Proceedings of the Second Southern Forestry Congress, held at New Orleans, La., January, 1920. 156 pp. 1920. Contains complete papers and discussions of the Congress, also the list of registered delegates. (Apply to J. S. Holmes, Secretary, State Forester, North Carolina Geological and Economic Survey, Chapel Hill, N. C.)

Floating Battleships In Asphalt

If the world's largest battleships were placed end to end to form a line six miles long, it would take 118,000,000 cubic feet of water to float them. This tremendous volume represents approximately the amount of asphalt taken from the Trinidad Asphalt Lake to pave streets since 1879.

TRINIDAD LAKE ASPHALT

nature-made and nature-tested, has become famous throughout the world for its long life and low maintenance cost. Countless centuries passed in the making of Trinidad Lake Asphalt, the sun, wind and rain of the tropics building durability into it. That's why it is less affected by heat, cold and traffic than any other bituminous material.

TRINIDAD RECORD No. 4

That No Other Bituminous Paving Material Can Equal

Columbus, Ohio—Bryden Road from Parsons Avenue to Twenty-second Street, an area of 12,573 square yards, was laid with Trinidad Lake Asphalt in 1888—32 years ago.

Maintenance Cost to Date 2.1 Cents Per Yard Per Year

Write for "THE ASPHALT TIME TABLE"

The Barber Asphalt Paving Company

Philadelphia

MODERN ROADS

"Modern Road Building and Maintenance—Principles and Practice," by Andrew P. Anderson, Highway Engineer, Bureau of Public Roads, U. S. Department of Agriculture. An exceedingly well-prepared paper-covered book of 146 pages, with numerous illustrations. Published for the use of engineers, contractors, road officials, students, and all others who are interested in the problems of public roads and their traffic. It deals with the following topics in relation to all kinds of roads: Planning the Road; Road Materials; Road Construction; Road Maintenance and Repair; and The Use of Explosives. (Apply to the Hercules Powder Company, Wilmington, Del.)

CITY PLANNING IN CAMBRIDGE, MASS.

Annual Reports of the Planning Board to the City Council of the City of Cambridge, Mass. Covers the years 1918-1919-1920. Maps and illustrations. (Apply to Arthur C. Comey, Secretary, Abbot Building, Harvard Square, Cambridge, Mass.

HOUSING

"The Housing Situation and the Way Out," by Lawrence Veiller, Secretary, The National Housing Association. Reprinted from the "Architectural Record." December, 1920, as National Housing Association Publication No. 55. A discussion of the housing shortage and an argument for federal aid to meet the problem. (Apply to the National Housing Association, 105 East 22d Street, New York, N. Y.)

NEW YORK HARBOR

Two reports of the New York, New Jersey Port and Harbor Development Commission. One is the Summary of the Joint Report with Comprehensive Plan and Recommendations. 65 pp. and map. 1921. Published as Legislative Document (1921), No. 33. This has been condensed from the two-volume report on port developments, which will appear shortly. The other consists of the advance issue of Chapters 9, 10, 11 and 14 of the Joint Report. 52 pp. 1920. Maps and diagrams. Covers in detail the elevated and underground railway freight projects and a discussion of the automatic-electric system. (Apply to William Leary, Secretary, 115 Broadway, New York, N. Y.)

HOUSING AND LABOR

"The Housing Problem in Its Relation to the Contentment of Labor," by Morton C. Tuttle, General Manager, Aberthaw Construction Company. Reprinted from the "Manufacturers' Record" at the suggestion of the National Housing Association. 1920. (Apply to the National Housing Association, 105 East 22 St., New York City, N. Y.)

PUBLIC UTILITIES

"The American Public Utilities Bureau and What It Can Do for You." Bulletin No. 1 of the American Public Utilities Bureau. A brief sketch of the public utility question and a prospectus of the services which the Bureau is prepared to offer to cities and utility corporations in adjusting their problems. (Apply to The American Public Utilities Bureau, 175 Fifth Ave., New York City, N. Y.)

ST. LOUIS TRANSIT SYSTEM

"The St. Louis Transit System, Present and Future," by Harland Bartholomew, Engineer of the City Plan Commission. 30 pp. Maps and diagrams. 1920. Contains survey of the present situation and plans for more effective re-routing of transit lines. (Apply to Frank E. Lawrence, Jr., Secretary, City Plan Commission, St. Louis, Mo.)

MOTOR TRAFFIC

"Proposed Uniform Vehicle Law," as endorsed by the Motor Vehicle Conference Committee. 32 pp. The proposed law was prepared by a committee representing a number of interested organizations, after a thorough consideration of the subject from the standpoint of the road builder, the user of the road, the manufacturer of vehicles, the carrying capacity of the road, the pedestrian, and the general public's welfare and safety. (Apply to the National Automobile Chamber of Commerce, Inc., Marlin-Rockwell Building, 366 Madison Avenue, New York, N. Y.)

PUBLIC WORKS

First Biennial Report of the Department of Public Works of the State of Idaho, for the period ending December 31, 1920. 221 pp. Illustrated. Part 1 contains the reports on Capitol Construction, Capitol Maintenance, the Bureau of Supplies, and Heyburn Park; Part 2, the report of the Bureau of Highways. (Apply to William J. Hall, Commisioner, Boise, Idaho.)

COMMUNITY TRUSTS

Two pamphlets: "The New York Community Trust," by Joseph N. Babcock, Vice-President, The Equitable Trust Company of New York; and "The Fundamentals of a Community Trust," by Frank J. Parsons, Director of the New York Community Trust. These pamphlets give a concise idea of the objects and methods of community trusts. (Apply to Frank J. Parsons, Director, The New York Community Trust, 55 Cedar Street, New York, N. Y.)

HIGHWAYS

Second Biennial Report of the State Highway Commission of Wyoming, for the period beginning February 28, 1919, and ending September 30, 1920. 121 pp. Illustrated. (Apply to C. E. Hoffhine, Chief Clerk, Wyoming Highway Department, Cheyenne, Wyoming.)

PUBLIC UTILITIES

"Flexible Fares." A discussion of service at cost as applied to the New York Transit Lines, with comment on Governor Miller's program. 46 pp. 1921. Prepared by the City Club Committee on Public Service, and issued by the City Club. (Apply to Henry C. Wright, Chairman, Committee on Public Service, The City Club of New York, 55 West 44th Street, New York, N. Y.)

THE FORESTS OF OREGON

Tenth Annual Report of the State Forester of Oregon for the year ending December 31, 1920. 60 pp. Illustrated. Especial attention is given to the aeroplane patrol. (Apply to F. A. Elliott, State Forester, Salem, Ore.)

ELECTIONS

"The High Cost of Elections." 24 pp. 1921. A report prepared by the Chicago Bureau of Public Efficiency covering conditions in Chicago and Cook County. (Apply to Harris S. Keeler, Director, Chicago Bureau of Public Efficiency, 315 Plymouth Court, Chicago, Ill.)

FORESTRY IN MAINE

"Forest Protection and Conservation in Maine." By Forrest H. Colby, Land Agent and Forest Commissioner. 1919. 163 pp. Illustrated. A detailed account of forestry work and fire prevention in the state of Maine, together with the Maine forestry laws. There is a chapter on the Forestry Department of the State University and a report on the spruce budworm and white pine weevil, by M. W. Blackman, Ph.D., Professor of Entomology, New York State College of Forestry, Syracuse, N. Y. (Apply to Forrest H. Colby, Forest Commissioner, Bingham, Me.)

Municipal Reports

Montclair, N. J.—Twenty-fifth Report of the Board of Health. From January 1, 1919, to December 31, 1919. (Apply to Herbert B. Larner, S.B., Health Officer and Registrar, Montclair, N. J.)

Johnstown, N. Y.—Forty-third Annual Report of the Board of Water Commissioners. Filed with City Clerk January 20, 1921. (Apply to Grover E. Yerdon, City Clerk, Johnstown, N. Y.)

Dayton, Ohio.—Annual report, Division of Health, Department of Public Welfare, for the year 1920. (Apply to D. F. Garland, Director of Public Welfare, or A. O. Peters, M.D., Commissioner of Health, Dayton, Ohio.)

Kalispell, Mont.—Seventh annual report of the Water Department for the year ending December 31, 1921. (Apply to W. H. Lawrence, Superintendent of Water Department, Kalispell, Mont.)

White Plains, N. Y.—Building Zone Ordinance for the City of White Plains, effective June 29, 1920. (Apply to William H. Carpenter, Jr., City Clerk, White Plains, N. Y.)

Water Supply and Water Power Engineering

RELIABLE ESTIMATES OF COST

Recommendations as to the best means of carrying out Public Works to insure a maximum benefit from the investment.

PREPARATION OF PLANS
SUPERVISION OF CONSTRUCTION

JAMES P. WELLS
HYDRAULIC ENGINEER

Main Office
249 Cutler Building, Rochester, N. Y.

NEW YORK CITY
KNOXVILLE, TENN.

CHICAGO, ILL.
TORONTO, ONT.

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Useful Mop and Water Truck

It is a sloppy job to carry water for washing floors around in a pail which has to be emptied frequently. The Kent Vacuum Cleaner Company, Rome, N. Y., has recently placed on the market the "Utility" mop and water truck, which is made expressly to handle the clean and dirty water incidental to scrubbing. This outfit, which is specially suitable for schools and all other public buildings, takes the place of pails and is made in two sizes. It is claimed that one man and a truck equipped with two 15-gallon cans and a mop-wringer, can carry as much water as five men with two 12-quart pails each.

The cleaning and mopping can be done without constantly changing or using the same water over and over. The operator is able to stand erect when using the wringer, mounted on top of one of the cans. The outfit consists of two cans, one for clean water and one for dirty water. The cans are heavily wired around the top and bottom and are covered with non-rusting solution, so that they are not affected by the strongest soap or soap powders. The truck is equipped with four heavy rubber-tired wheels and can be easily moved about.

A HANDY COMBINATION FOR JANITOR OR PORTER

Meeting of Southwest Water Works Association

The Southwest Water Works Association, comprising the eight states of Texas, Arkansas, Oklahoma, Louisiana, Missouri, Kansas, Nebraska, and New Mexico will hold its annual convention in Oklahoma City, May 9 to 12, inclusive, with headquarters at the Skirvin Hotel. Over 500 water-works superintendents will attend the convention, and in addition guests and material men are expected to be out in force. Full information may be secured from the Secretary, E. L. Fulkerson, 617 Washington St., Waco, Tex.

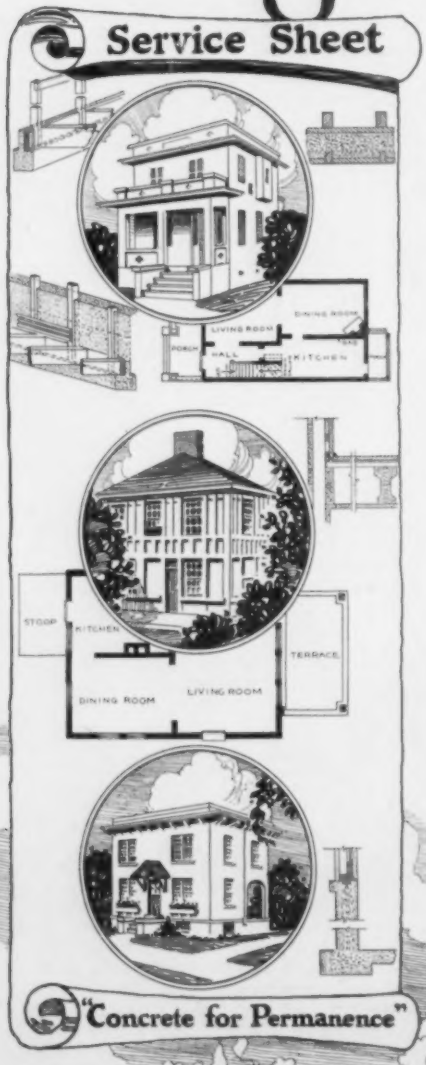
Hollow Building Tile in Movies

The Hollow Building Tile Association, Conway Building, Chicago, Ill., has just announced the completion of a two-reel motion picture, showing the manufacture and advantages of hollow building tile.

The film takes up the manufacture of hollow tile at typical plants, shows the removal of the clay and how it is ground, mixed and finally comes out of the die shaped. It is cut into lengths, conveyed to the drying room and burned in the kiln. Following this there is an animated cartoon illustrating the insulation properties of hollow tile. A hollow-tile house and an ordinary house are shown in the foreground. Up in the sky the Sun frowns menacingly and blows his breath at the two houses. His breath at first seems to be a cloud traveling toward earth, but as the cloud comes close the audience sees that it is made up of a myriad of little figures, "heat-devils," armed with forked spears and adorned with forked tails. These devils dive through the walls of both houses and disappear. The scene inside the ordinary house reveals the heat devils in a victory dance around the sweltering housewife. A scene inside the hollow-tile home shows the housewife perfectly comfortable and not a heat devil in sight. They are then shown in the air spaces, where they disappear in clouds of smoke. Animated thermometers register the result, 106 degrees outside and 72 inside. Another animated scene shows winter, and Jack Frost blowing a cloud of "chilly children" toward the two houses. Similarly as in the summer scene, the audience is impressed with the fact that the air spaces form an insulation barrier which the cold of winter cannot penetrate. Still further illustrations show the fire-proof qualities of hollow tile.

This film is intended first to make the round of Association members, then a tour of chambers of commerce, Rotary clubs, etc., and for use at various builders' conventions. With one of the De Vry suitcase projection machines the film can be shown in any place where connection can be made with an electric light socket, and the picture will be exhibited before Y. M. C. A.'s, high school classes, at farmers' grange meetings, and eventually at regular motion picture houses.

Valuable Information on Workingmen's Homes



SEVERAL years ago the increasing interest in small homes of permanent, fireproof type prompted us to prepare a Service Sheet on a type of employes' house that we had built at two of our own plants.

This Service Sheet proved to be so popular that we prepared three others—the series of four sheets giving fairly complete details, working methods, specifications, etc., of (1) Pre-cast Slab and Beam house construction, (2) the Gunite-and-Frame Method, (3) Solid and Double-Wall construction with special forms and (4) the Ingersoll Home System, which has lately attracted considerable attention.

We have a small reserve stock of these practical Service Sheets and will gladly send copies to any manufacturer, engineer, architect, contractor, builder, chamber of commerce, or property owner interested.

Copy of the 96-page ALPHA Handbook will also be sent free of obligation. No charge if you live east of the Mississippi River. We feel obliged to ask those living out of our sales territory to send fifty cents to cover cost of printing and mailing this literature.

Mention *American City*.

ALPHA PORTLAND CEMENT CO.

Offices, EASTON, PA., CHICAGO, ILL.

Sales Offices: New York, Philadelphia, Boston, Pittsburgh, Baltimore, Savannah, Bellevue, Mich., Ironton, Ohio.

AUTO GOING 10 MILES PER HOUR ON UNOILED ROAD, JULY 3, 1906

The Value of Oiled Roads

The accompanying illustrations, which were furnished us through the courtesy of F. P. Allen, manager, Road Oil Department, The Standard Oil Company, of Indiana, show in an excellent manner the value of oiled roads. The first photograph shows Observatory Road, the West End of Cincinnati, an unoiled highway, with an automobile traveling at 10 miles per hour. The dust coming from the front wheels is dashed aside like the water from the prow of a liner and completely obscures the view in the rear of the automobile. The other photograph, taken at the same time on Grandin Road, Cincinnati, shows the oiled road-bed with an automobile going at 15 miles per hour, and the entire elimination of dust. In addition to ridding roads of the dust nuisance, oiling forms a blanket on the surface of the roadway and thus reduces the cost of maintenance of highways that are treated in this manner.

Installation the Vital Question with Outdoor Fountains

The difference in results obtained from out-of-door drinking fountains is a matter of serious consideration among many city authorities and park boards. Some communities have had perfect satisfaction, while others report broken fixtures, chipped enamels and destructive freeze-ups before the first winter is over.

The whole difficulty seems to lie in the consideration given before installing. First of all, to be correct from any standpoint, the fixture must be anti-freezing to operate the year round in the open,

AUTO TRAVELING AT 15 MILES PER HOUR ON AN OILED ROAD, JULY 3, 1906

Maintaining Park Roads

As a result of careful planning to attain the "City Beautiful," most main arteries of travel from one section of a city to another is through its parks, this produces very heavy traffic.

Quite often, parks containing hundreds of acres had their beginning in just a small plot of ground; additions were made, the management changed frequently, and as a consequence one single park may contain almost every kind of road.

To be able to repair the various roads, a large amount of equipment is required.

The beautiful parkway shown above constructed of

STANOLIND PAVING ASPHALT, "C"

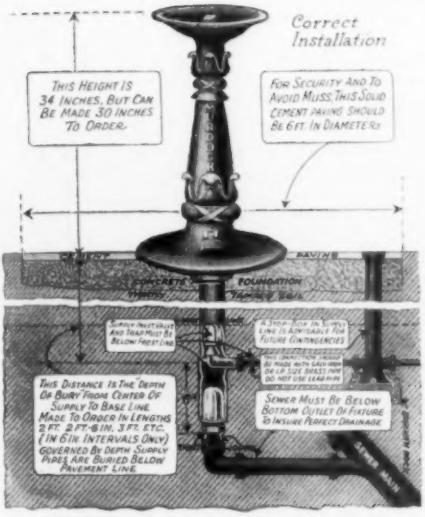
has been in use for over 5 years, and at the present time it is in perfect condition, without one cent having been spent for maintenance.

We believe that no better kind of roadway for parks was ever devised than those of asphalt.

Our booklet "Stanolind Paving Asphalt" containing information regarding this type of road as well as all other asphaltic roads will be mailed free upon request.

STANDARD OIL COMPANY
(INDIANA)

910 So. Michigan Ave. Chicago, Ill.


Correct Installation
This Height Is 34 Inches, But Can Be Made 30 Inches To Order.
For Security And To Avoid Muss This Solid Cement Paving Should Be 6 Ft. In Diameter.
Concrete
Foundation
This Distance Is The Depth Or Bury From Center Of Supply To Base Line. Made To Order In Lengths 2 Ft., 2 Ft.-6 In., 3 Ft., Etc. (1 In. 6 In. Intervals Only) Governed By Depth Supply Pipes Are Buried Below Pavement Line.
Sewer Must Be Below Bottom Outlet Of Fixture To Insure Perfect Drainage

THE PROPER METHOD OF INSTALLING AN OUTDOOR FOUNTAIN

and not require repairs or replacement. Second, it must have a strong water-supply control, so as to conserve the use of water and make the fixture practical. Third, it must draw a fresh supply of water from the main for each drink and not use warm, stagnant water from its stand-pipe which may become polluted and unsanitary during the heated months of the year. After these fundamental precautions it should be remembered that all vitreous substances, such as porcelain or enamel, will chip and fracture, and will withstand neither the ravages of winter nor the mistreatment of public usage. Polished bronze or brass and solid iron, painted, are the only materials which should be used in the construction of outdoor drinking fountains.

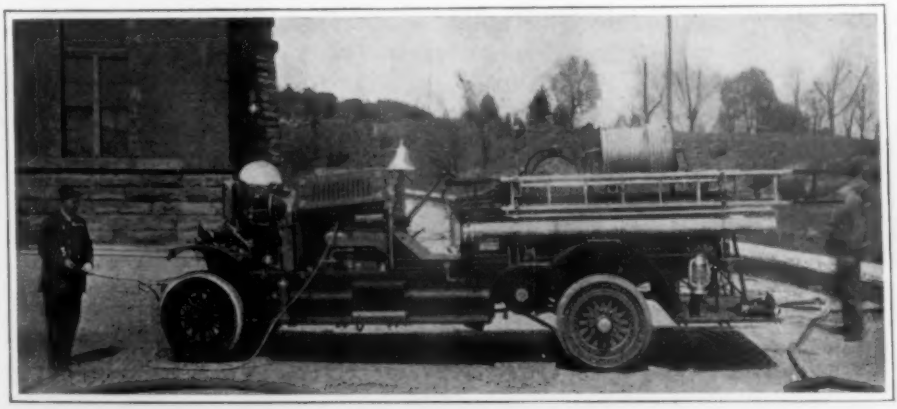
Many cities have found the Murdock "Bubble-Font," made by the Murdock Manufacturing & Supply Company, Cincinnati, Ohio, to be very practical for out-of-door use.

Experience has developed a standard method of installation for an out-in-the-open, all-year-round drinking fountain that is put in for the purpose of being a real service to the public, a fountain that is still operating after the first hard freeze and is ready to use at any moment when the early spring sunshine tempts the public out into the open. This method of installation, shown in the accompanying illustration, will be of value to readers of THE AMERICAN CITY.

Thawing Frozen Hydrants

In localities affected by a freezing temperature, the steam fire engine boiler was always dependable for an abundant supply of live steam, with the aid of which frozen hydrants were readily thawed and placed in service in time of fire. The absence of steam for thawing purposes has sometimes been an argument against the use of gasoline-driven fire engines and although many have waived the benefits of steam for thawing purposes, in order to gain the many superior advantages of the more modern gasoline engine, the lack of thawing facilities has always been deplored among firemen when dealing with cold weather problems.

The Ahrens-Fox Fire Engine Company, Cincinnati, Ohio, has developed a thawing device which can be attached to the gasoline fire engine and used at once upon arrival at a frozen hydrant. This thawing apparatus is a complete miniature steam generator, comprising a boiler with all the essential appliances, such as pop safety valve, pressure gauge, glass water gauge, steam valve and connection for thaw hose, drain and blow-off valves. The heating unit uses the exhaust gases from the engine and vertical tubes for the heating surfaces, making it possible to generate steam quickly. The steam pressure used is about 15 pounds per square inch and without replenishing the water-supply in the boiler will furnish steam through a 1/8-inch diameter orifice for about 30 minutes. The apparatus is detachable, because, obviously, it is needed only as the seasons demand.



COMPACT HYDRANT THAWING DEVICE ATTACHED TO MOTOR PUMPER

BITOSLAG
REG. U.S. PAT. OFFICE

Equal to the Demands of City Traffic

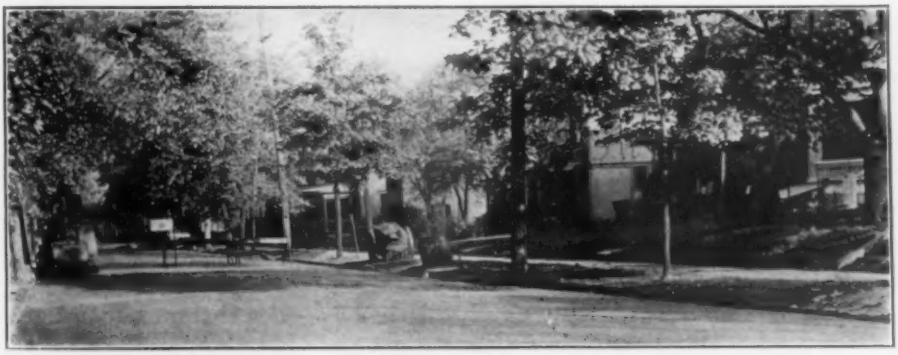
Few pavements can withstand the constant abrasion of horses' feet and the damaging pounding of motor truck tires and chains like Bitoslag does. It is a pavement that

Wears Like Iron

and lasts many years. It is simple in construction and is equally durable and effective on country highways or city streets. Extremes of temperature have no effect on Bitoslag roads. Let us know your needs and we will be glad to consult with you at once to your advantage.

Correspondence Invited

BITOSLAG PAVING Co
90 West Street - New York City



EUCHTEL AVENUE, AKRON, OHIO, A RESURFACED BRICK STREET

Rock Asphalt for Street Maintenance

Street maintenance is no small problem, especially in those cities which are not equipped for mixing and laying bituminous materials. Work is often neglected until the streets are beyond repair and complete reconstruction is necessary. Recently several cities have adopted natural rock asphalt for patching and resurfacing. The material is ready-mixed, and has a further advantage in that it can be laid cold. The finished surface is much the same as a sheet asphalt pavement.

Much success has been obtained in the resurfacing of old brick pavements with rock asphalt. The accompanying illustration shows a typical resurfaced street in Akron, Ohio. The old brick street was first rolled to develop all weak spots, and the depressions were filled to the proper grade. The surface was then thoroughly cleaned and a coat of asphalt paint applied. On top of this, Kentucky rock asphalt, furnished by the Kentucky Rock Asphalt Company, Louisville, Ky., was spread to a depth of 3 inches loose, and compacted to a depth of 2 inches under the roller. The street was opened to traffic after 3 days' rolling.

Practically all rock asphalt used east of the Mississippi comes from Edmonson County, Ky., and is known as Kentucky rock asphalt. The material occurs in great rock formations underlying the surface like seams of coal. Undoubtedly the deposits were once great beds of oil-bearing sand. The lighter oils gradually evaporated, leaving a heavy asphalt residue or bitumen which bound the sand together into solid rock. This rock is now being quarried and broken up on a large scale. The pulverized rock is a product much like a sheet asphalt mix.

New Atlanta, Ga., Office

The National Steel Fabric Company, 908 First National Bank Building, Pittsburgh, Pa., announces the opening of an office in Atlanta, Ga., in charge of H. S. Gibboney, District Manager, 604 Walton Building, Atlanta, Ga.

A New Excavator Crane for All Types of Work

Progressive manufacturers of earth-moving machinery are continually at work to improve the various types of excavating machinery. One of the most recent developments which has been brought out by Pawling & Harnischfeger Company, Milwaukee, Wis., is known as its No. 206 machine, which is a heavy duty, large capacity, excavator of the full tractor type. The corduroy traction for this crane consists of cast-steel treads 20 inches in width. The sprockets which are placed on 9-foot centers are manganese steel, bronze-bushed, and adjustable to take up wear. The short-turning radius makes it easy to handle, and a complete turn in twice its width is possible. The elimination of leading-wheels gives this crane a larger radius of operation.

In order to facilitate the movement of the crane, two traction speeds are provided, one for moving from one location to another over roads or good earth surfaces, and a lower speed for traveling over soft or extremely hilly districts, or when coming out of deep ditches. The power plant consists of a four-cylinder Waukesha heavy-duty motor of 50 h. p. with Warner vacuum feed so that fuel is supplied the engine regardless of the position of the crane, and a storage tank carried below at the rear contains sufficient fuel for about 20 hours' continuous operation. For use with a ¾-yard bucket, a 30-foot boom of braced structural steel is furnished, or a 38-foot boom for a ½-yard bucket or for drag-line or clam-shell buckets.

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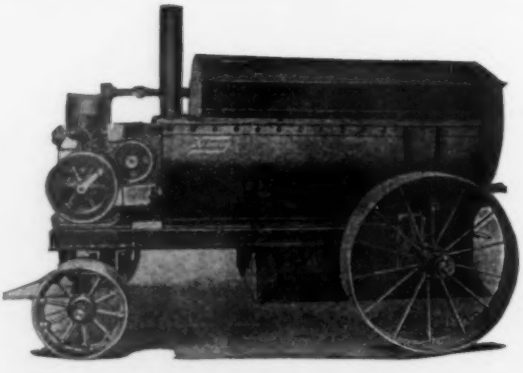

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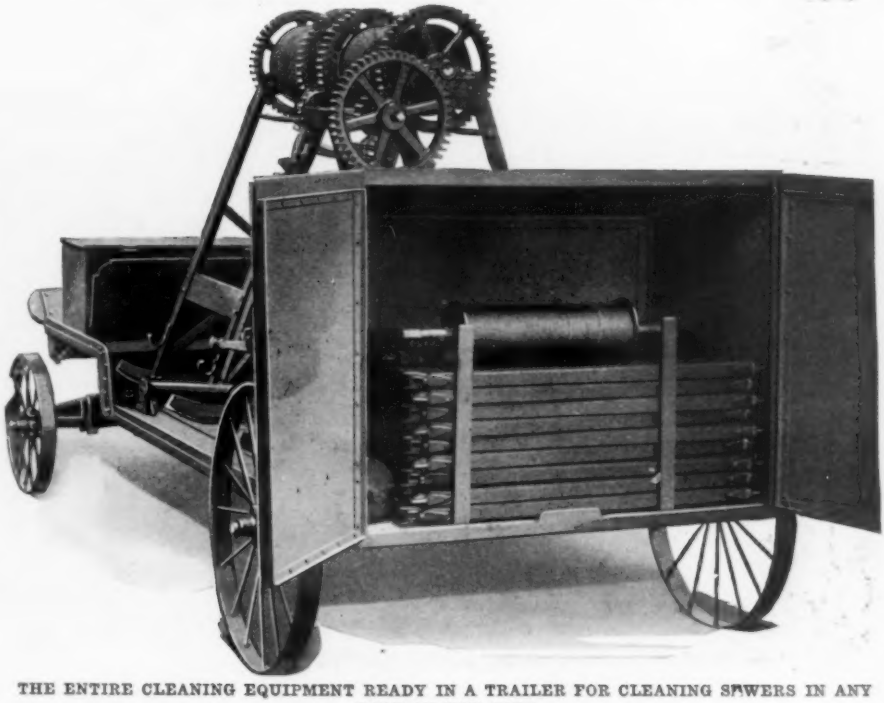

THE ENTIRE CLEANING EQUIPMENT READY IN A TRAILER FOR CLEANING SEWERS IN ANY PART OF THE CITY

Portable Sewer Cleaning Equipment

For a number of years the Turbine sewer cleaning machine has been well known to municipalities which have had trouble with clogged sewers. This machine has been called a great many strange names, among them the "go-devil" by a man in the South who was greatly surprised at the speed and determination it showed in opening up an almost completely clogged sewer line.

The Turbine Sewer Machine Company, 195 Eleventh Street, Milwaukee, Wis., has just developed a portable mounting for this machine, which is depicted above. This trailer device, which can easily be pulled by any sewer department service truck, enables the gang to have all the tools and the machine under lock and key at all times when not in use. Thus the machine may be hauled out in the morning to a job and worked all day, and, if the complete line has not then been opened up, the machine can be stored in the box, locked up with all the tools in the truck mounting, and rest secure from any danger of theft.

New Road Machinery Booklet in Spanish

F. H. Conklin and W. G. Harrington, Inc., 50 Church Street, New York City, acting as the Export Department for the Good Roads Machinery Company, 836 Bulletin Building, Philadelphia, Pa., has published a complete catalog of Champion and Climax rock-crushing and road-building machinery, Monarch road rollers and Winner road graders in Spanish for the Central and South American export trade.

Acknowledgment

The interesting aeroplane photograph showing the concrete pavements and sidewalks in Knoxville, Tenn., which appears as the front cover of this issue of THE AMERICAN CITY, was furnished through the courtesy of the Portland Cement Association, 111 West Washington Street, Chicago, Ill. Knoxville, Tenn., is an excellent example of a city built from a city plan, as it was developed during the war as one of the industrial housing schemes.

Better Lighting for Salt Lake City

A contract has just been given to the Utah Power & Light Company by Salt Lake City for an extensive addition to the city's ornamental street lighting system, which when executed will give Salt Lake the distinction of being one of the best lighted cities of its size in the world.

The contract calls for 112 standards, each carrying three 6.6-ampere General Electric Company's ornamental luminous arc lamps. The Union Metal Manufacturing Company, Canton, Ohio, will furnish the standards, which

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THE NEW SALT LAKE CITY STANDARD

will envelop the present trolley poles and carry two lamps below the trolley wire and one above. The total cost of the installation will be approximately $100,000.

Of special significance is the fact that the extension to the lighting system was brought about directly as the result of the success attending the first installation. Salt Lake City will now have 182 lighting standards with 546 luminous arc lamps, giving a total candlepower of 819,000 on less than two miles of streets, which is approximately 90 candlepower per foot of street lighted. The second installation is interesting proof that after three years' trial of the intensive white way the business men of Salt Lake have decided that it is a good investment and worthy of extension.

New Ash Truck Loader

In the accompanying illustration there is shown an auto-conveyor for loading and hauling garbage and ashes and all kinds of municipal rubbish, which has been developed and placed on the market by George W. Otterson, Springfield, Ohio. This conveyor is a labor-saving device, inasmuch as but two men are required for its full operation, a driver and a laborer, whereas the ordinary methods now in use require from three to five men for each vehicle.

The auto-conveyor has a water-tight body of 8 cubic yards capacity with a bucket or skip of ⅓-cubic-yard capacity, which operates on a track attached either to the side or over the rear end of the body. Side-loading equipment is so constructed that the track is movable forward and rearward along the body, and the rear-end loading equipment is provided with an adjustable trip for distribution of the load. The bucket, or skip, is hoisted from the ground level to its dumping position over the body by means of cables running over drums driven by a water motor, pressure from which is supplied by means of a small centrifugal pump which is driven by the truck motor.

The bucket travels at approximately one foot per second, being hoisted or lowered to the ground, and will travel to the dumping point and deposit its load into the body automatically and return to the ground in less than one minute. The water motor acts as a brake in lowering the empty bucket to the ground. Shields are provided to prevent odor and dust nuisances, and the equipment is cleanly and fly-proof. The body may be divided into two compartments, one for garbage and the other for ashes. This feature is especially adaptable to small communities where it is desired to collect both ashes and garbage at the same time. When the body is loaded and ready to go to the dump, the side or end track may be drawn in close to the body and fastened.

EASY LOADING MAKES THIS ASH AND GARBAGE COLLECTOR SPEED UP THE WORK

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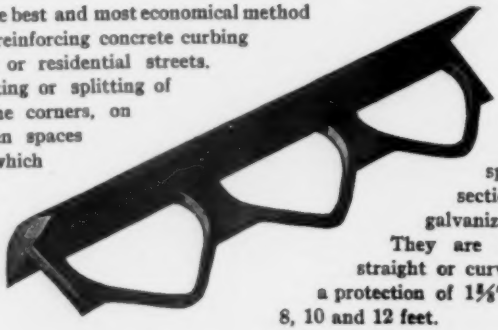

Truscon Curb Bars are manufactured from special rolled steel sections, and are heavily galvanized after forming. They are furnished in either straight or curved bars and provide a protection of 1⅛". Standard lengths, 8, 10 and 12 feet.

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